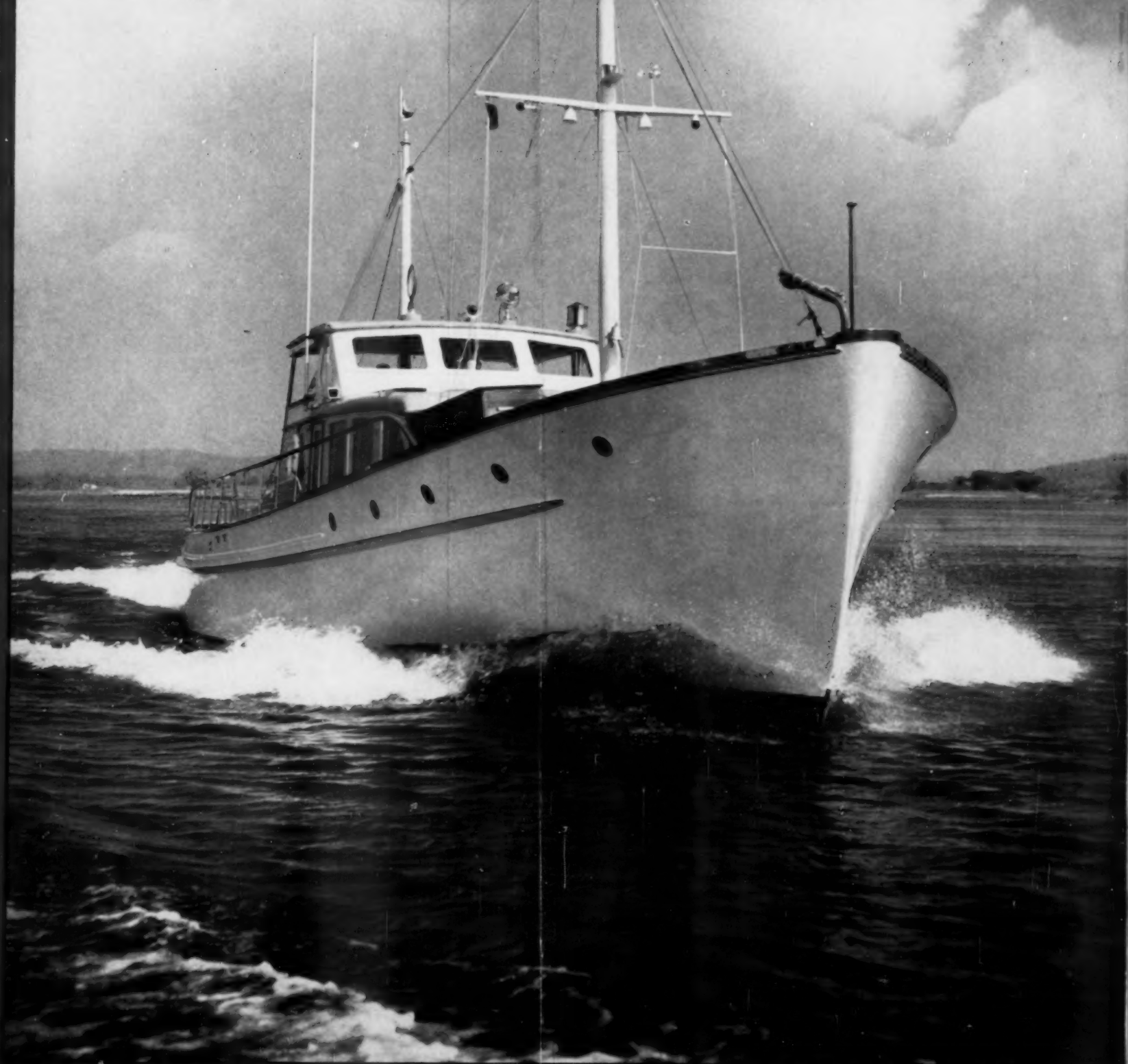


IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

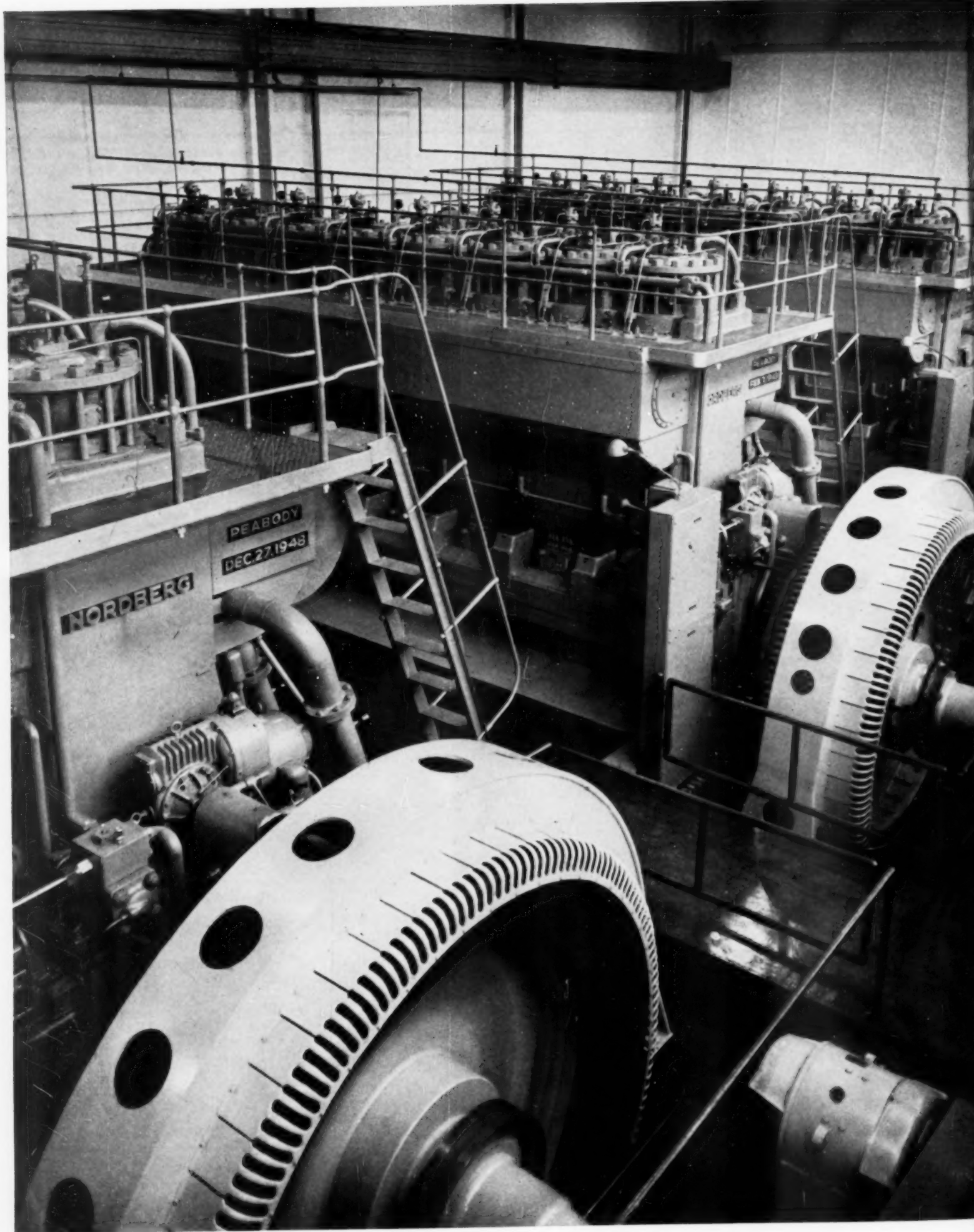
DIESEL *and* **GAS TURBINE PROGRESS**



FIVE DOLLARS PER YEAR

JANUARY, 1958

FIFTY CENTS PER COPY



GET ALL THE POWER but spare the horses

**You get more power on less fuel and longer periods
between overhauls with Texaco Ursa Oil**

Texaco Ursa Oil prevents harmful deposits in diesel, gas and dual-fuel engines. It keeps rings and valves free for full compression and complete combustion ... and it filters beautifully.

This is what Texaco customers claim, and you can see there is a significant number of them:

For over 20 years, more stationary diesel horsepower in the U. S. has been lubricated with Texaco than with any other brand.

There is a complete line of Texaco Ursa Oils to meet the requirements of every diesel, gas and dual-fuel engine—regardless of make or model. A Texaco representative will be glad to suggest the one designed to keep your power output up, maintenance costs at a minimum.

Call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TUNE IN ... Metropolitan Opera Radio Broadcasts Every Saturday Afternoon



LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

**HARRISON
PAVES THE WAY
TO COOL
PERFORMANCE!**



Temperatures made to order for all types of diesel engines. Harrison heat exchangers are rugged, reliable and compact... engineered to provide the optimum in cooling efficiency.

**Asphalt Plant Runs 5,000 Hours
With No Down Time—Powered By
Harrison-Cooled GM Diesel**

Harrison helps make mile after mile of highway material... and heat never gets out of hand! This GM Diesel-operated asphalt plant worked the equivalent of over 200 twenty-four-hour days with no down time. And Harrison heat exchangers helped make this outstanding endurance possible. They're rugged, reliable and always in control of vital temperatures even on the toughest jobs. Every Harrison heat exchanger is the product of over 47 years' experience... assuring you of top quality and dependability. That's why you'll find Harrison at work, cooling Diesels in every line of industry... every line of defense. So if you have a cooling problem, look to Harrison for the answer.

TEMPERATURES MADE TO ORDER

HARRISON



HARRISON RADIATOR DIVISION • GENERAL MOTORS CORPORATION • LOCKPORT, NEW YORK

DIESEL *and* GAS TURBINE PROGRESS

REX W. WADMAN *Editor and Publisher*

MEMBER OF



Business Publications Audit
of Circulation, Inc.

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

BRUCE W. WADMAN *Executive Vice Pres.*
CHARLES M. EDLER *Vice President*
JAMES W. BROWN *Midwest Editor*
F. HAL HIGGINS *Western Field Editor*
PEGGY R. TOMACK *Production Manager*
RUTH R. REINER *Circulation Dept.*

MEMBER OF

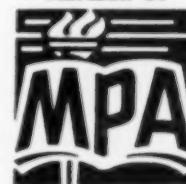
VAC

Verified Audit Circulation
Company

DIESEL PROGRESS for January, 1958, Vol. XXIV, No. 1. Published Monthly by Diesel Engines, Inc., 816 N. La Cienega Blvd., Los Angeles 46, California. Phone OLeander 5-7410. Subscription rates are \$5.00 for U.S.A. and possessions. All other countries \$7.50 per year. Subscriptions may be paid the London office at £2-12s-6d per year. Accepted as Controlled Circulation Publication at Long Prairie, Minnesota.

DIESEL PROGRESS is indexed regularly by Engineering Index, Inc. and is available in microfilm editions from University Microfilms, Inc., Ann Arbor, Michigan.

MEMBER OF



Magazine Publishers
Association, Inc.

CONTENTS FOR JANUARY, 1958

A Pair Of Florida Yachts	25
Continental Air Defense Relies On Diesels	28
Powerful Tug <i>St. Regis</i>	30
Three Huge Offshore Submersible Rigs	32
Arctic Tanker USNS <i>Alatna</i>	34
Viscous Rotary Dampers	35
M/V <i>I. F. Freiburger</i>	36
A New Petters Rated At 3,000 RPM	38
Ipswich, Massachusetts	39
Laclede Storage Success	42
Fine New Quarters Of Cummins Diesel Michigan, Inc.	44
New <i>Tampa</i> Pilot Boat	46
What's Going On In England	48
Use Of Residual Oil As Diesel Fuel	49
Automotive Diesel Progress	54
Gas Turbine Progress	56

EDITORIAL AND PRODUCTION OFFICES

816 N. La Cienega Blvd.

Los Angeles 46, Calif.

BUSINESS OFFICES

MILWAUKEE 3:
Bruce W. Wadman
2040 W. Wisconsin Ave.
Division 4-5355

NEW YORK 36:
Charles M. Edler
15 W. 44th St.
OXford 7-8257

LONDON E.C. 4:
G. L. Fetherstonhaugh
St. Paul's Corner
Ludgate Hill

TULSA 3:
O. F. Cozier
605 Mayo Bldg.
Diamond 3-1335

FIELD EDITORS

HIALEAH, FLA.:
Edwin Dennis
250 W. 50th St.
TUxedo 8-2188

LOS ANGELES 46:
James Joseph
8421 Melrose Ave.
OLive 3-4542

HOUSTON, TEXAS:
Michael T. Pate
1948 Lexington
JACKson 2-9088

PORT LAYACA, TEXAS:
Ruel McDaniel
P. O. Drawer 45

TULSA 3:
Jack F. Cozier
305 Daniel Bldg.
Diamond 3-1335

JEFFERSON CITY, MO.:
L. H. Houck
400 Linden Dr.
Phone: 6-2993

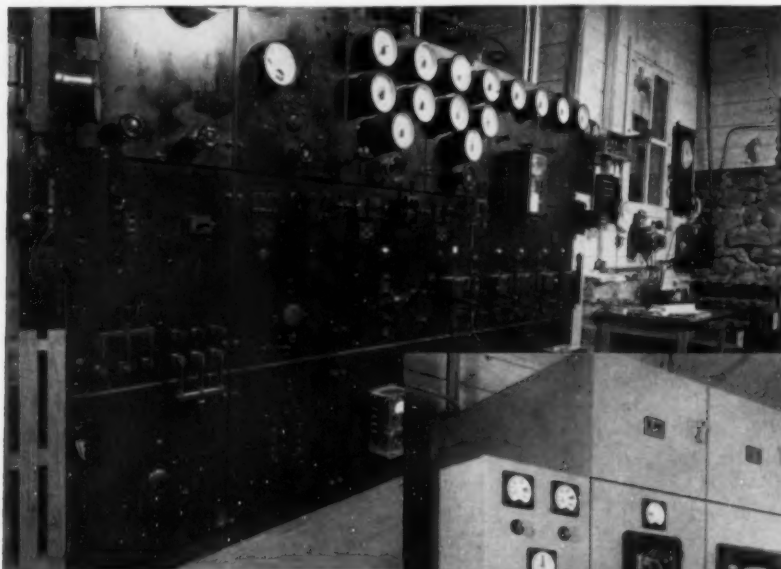
NORTHWOOD, MIDDX, ENGLAND:
B. W. Lansdowne
"Oaklands," Nicholas Way

DETROIT 39, MICH.:
James W. Brown
13936 Kinloch Road
KENwood 2-1545

EVANSVILLE, IND.:
A. D. Burroughs
605 W. Maryland St.
HARRison 3-7313

FRONT COVER ILLUSTRATION

Scelp, a 68 ft power Ketch designed by Eldredge-McInnis, Inc., built by Quincy Adams yacht Yard for Clifford C. McAleenan of Guilford, Conn. It is powered with 2 GM diesels 223 hp, 2 cyc, 6 cyl, 4½x5. Photo by Morris Rosenfeld, New York City.



Old

Old switchgear at Big Falls, Minnesota hydroplant of Border Counties Power Cooperative, Inc. System expansions had caused this board to become dangerous by today's standards, capacity insufficient, and increasingly tedious to handle.

New

Custom-designed by E-M from standard components, this new switchgear at Big Falls gives extra safety and convenience. All apparatus is completely enclosed, yet readily accessible because of E-M's specially designed Swing-Door Instrument Panels. Operation, inspection, and testing is safe, convenient, and simple.



Making switchgear meet power system expansions

● Power systems grow larger . . . and larger . . . and larger. Electrical apparatus of all types must keep pace with this rapid expansion. The plant switchgear, with its vital safety and control functions, must be closely matched to increased demands made upon it.

At Border Counties Power Cooperative, Inc., size of the system *tripled*. Having had previous experience with E-M's personalized engineering assistance and with the safety and service of E-M designed apparatus, they called on E-M engineers to work out the new switchgear with consulting engineers R. D. Thomas and Associates.

Equipment necessary to handle the greatly increased system had to be fitted deftly into available space. This made E-M's Swing-Door Instrument Panel a natural choice, as this panel makes use of every available inch of space, both on door and interior of cabinet. Mounted on hinges, the Swing-Door Panel opens as a door to

reveal a compact, easy-to-reach arrangement of components, all accessible without reaching across buses or terminals. The E-M Switchgear is designed for tomorrow's increased loads as well, with breakers of adequate interrupting capacity.

"Personalizing" of E-M Switchgear, as was done at Big Falls, means that each E-M board is *matched exactly* to what it will encounter in daily service. This complete, attentive, and highly specialized E-M engineering can be of service to you. Call your nearest E-M sales engineer for more facts, and be sure to write the factory for E-M Switchgear Publication No. 194.

ELECTRIC MACHINERY MFG. COMPANY
MINNEAPOLIS 13, MINNESOTA



Specialists in MODERN SWITCHGEAR DESIGN

IMPORTANT NEWS!

HERCULES TO MAKE LYCOMING-DESIGN ENGINES

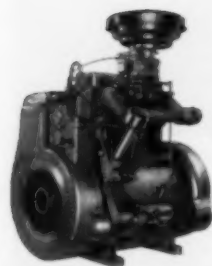
TO ENGINE USERS EVERYWHERE----

THE FAMOUS LYCOMING AIR-COOLED INDUSTRIAL ENGINE LINE, TWO AND FOUR CYLINDERS, WILL NOW BE MADE BY HERCULES MOTORS CORPORATION. THIS FORWARD STEP ENABLES HERCULES TO OFFER A PROVED, DEPENDABLE AIR-COOLED ENGINE IN ADDITION TO ITS WATER-COOLED ENGINES, GIVING USERS A WIDE SELECTION OF VALVE-IN-HEAD ENGINES IN THE DISPLACEMENT RANGE FROM 88 TO 339 CU. IN.

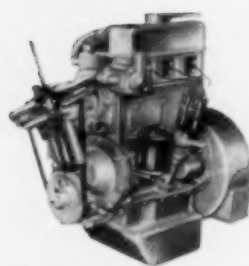
THE HERCULES REPUTATION FOR RELIABILITY, QUALITY MANUFACTURING AND ENGINEERING, PLUS THE COMBINED DISTRIBUTOR ORGANIZATIONS FOR BOTH LYCOMING AND HERCULES, ASSURE PRESENT CUSTOMERS AND POTENTIAL USERS MUCH BROADER SPREAD OF IMPROVED SERVICE FACILITIES.

FULL SCALE PRODUCTION OF THE LYCOMING AIR-COOLED ENGINE AT HERCULES CANTON OHIO PLANT SCHEDULED FOR EARLY 1958. YOUR INQUIRIES WILL BE APPRECIATED AND WILL BE PROMPTLY AND COURTEOUSLY ANSWERED.

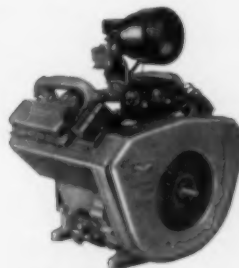
W.L. PRINGLE, PRESIDENT
HERCULES MOTORS CORPORATION
CANTON 2, OHIO



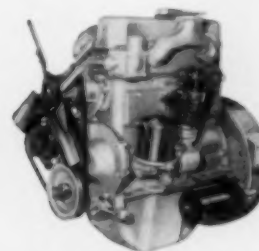
Lycoming-Design Hercules Two Cylinder Air-Cooled Industrial Gasoline Engine, Displacement 88 cu. in.



Hercules Three Cylinder Water-Cooled Gasoline (or Diesel) Engine, Displacement 130-149-169 cu. in.



Lycoming-Design Hercules Four Cylinder Air-Cooled Industrial Gasoline Engine, Displacement 176 cu. in.

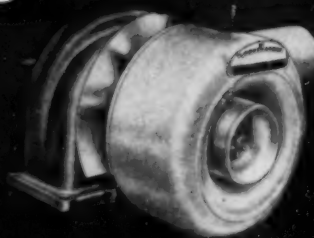


Hercules Four Cylinder Water-Cooled Diesel (or Gasoline) Engine, Displacement 173-198-226 cu. in.

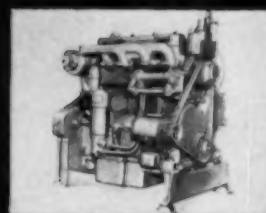
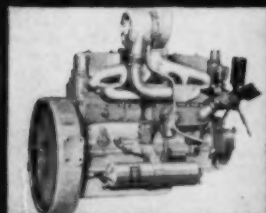
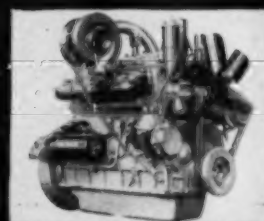
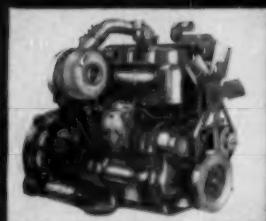
Hercules engines are also available in six cylinder 260, 298 and 339 cu. in. valve-in-head water-cooled types.

SCHWITZER TURBOS

Best For Your Operation



MOST HOURS IN
THE FIELD
GREATEST NUMBER
IN OPERATION
BEST INSTALLED
PERFORMANCE



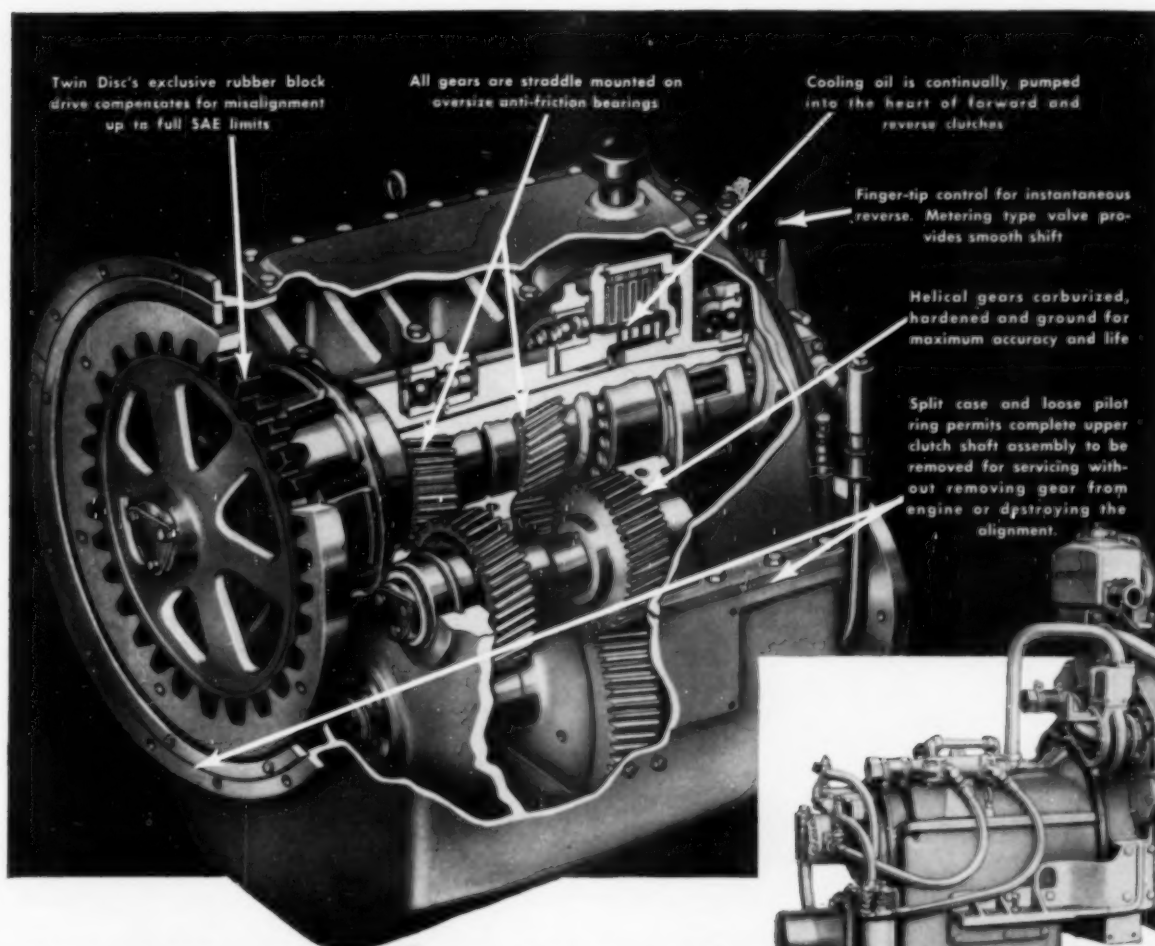
OPERATORS SAY

"I have been
using a Schwitzer
turbocharger on my
engine for several
years. It has
increased my
engine's output
and has been
very reliable."

CALL ON SCHWITZER FOR THE EXPERIENCE OF
MORE AND VARIED PRODUCTION INSTALLATIONS

SCHWITZER
C O R P O R A T I O N
INDIANAPOLIS, INDIANA

FANS DAMPERS PUMPS SEALS SUPERCHARGERS MODULATED DRIVES AIR MOTORS



Twin Disc's exclusive rubber block drive compensates for misalignment up to full SAE limits

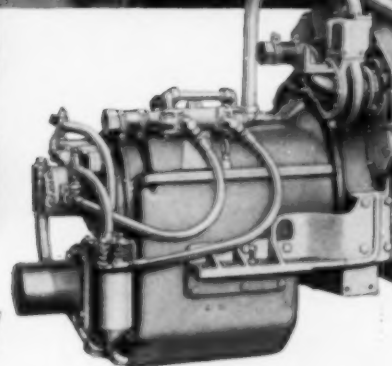
All gears are straddle mounted on oversize anti-friction bearings

Cooling oil is continually pumped into the heart of forward and reverse clutches

Finger-tip control for instantaneous reverse. Metering type valve provides smooth shift

Helical gears carburized, hardened and ground for maximum accuracy and life

Split case and loose pilot ring permits complete upper clutch shaft assembly to be removed for servicing without removing gear from engine or destroying the alignment.



New Twin Disc MG-521 **... for high output marine** **engines up to 450 hp**

More hours under continuous load . . . more rugged day-in and day-out operation . . . longer periods between overhauls . . . these are the requirements for today's higher speed, higher horsepower marine engines. And here's the new Twin Disc MG-521 Marine Gear to match these requirements in every respect . . . to give boat owners more hours of trouble-free operation . . . and greater-than-ever dollar value on their marine gear investment!

The new MG-521 is rated for 450 continuous hp operation at governed speeds ranging from 1625 to 1850 rpm and is available with 2:1, 3:1, and 4:1 reduction ratios . . . to meet an extremely wide range of engine makes and models.

Forward, neutral and reverse are "finger-tip" controlled by a selector valve, which hydraulically actuates the oil-cooled, multiple-plate forward and reverse clutches. Instantaneous clutch release assures faster, smoother response when shifting from forward to reverse.

A flood of oil is continuously pumped through the clutches, carrying away heat, assuring smooth clutch engagement and substantially reducing clutch plate wear.

Five hardened and ground helical gears, straddle mounted on anti-friction bearings on short rigid shafts—plus unusually heavy-duty construction throughout—assure extremely long life. Full horsepower may be transmitted continuously in either

forward or reverse without reducing service life.

Other MG-521 features include:

- Twin Disc's rubber block drive
- Emergency "come home" feature
- Upper gear housing may be removed for clutch and gear train servicing without destroying engine-gear alignment.

Write today to Twin Disc Clutch Company, Racine, Wisconsin, for complete details on the new heavy-duty MG-521 Marine Gear.

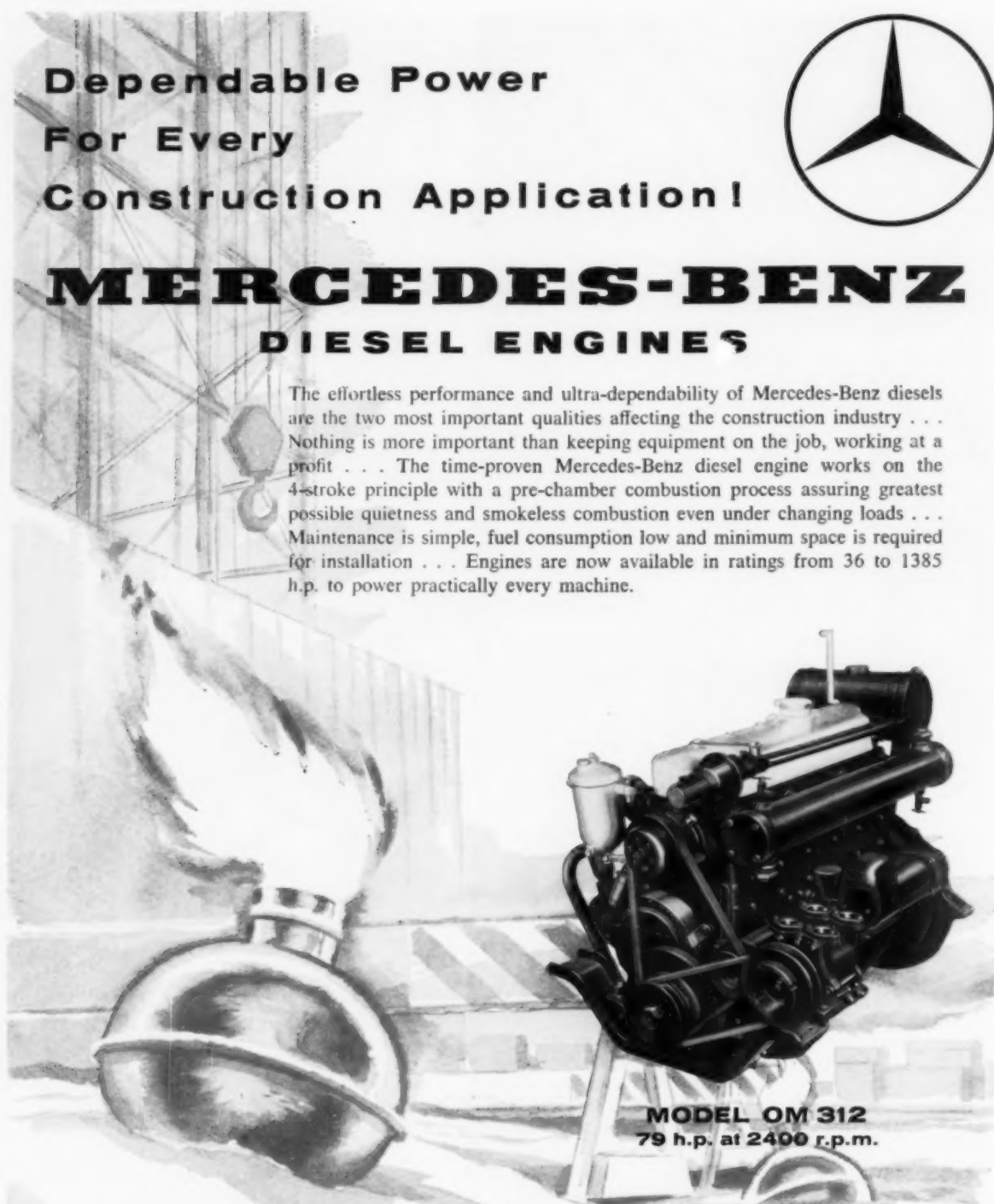


**Dependable Power
For Every
Construction Application!**



MERCEDES-BENZ DIESEL ENGINES

The effortless performance and ultra-dependability of Mercedes-Benz diesels are the two most important qualities affecting the construction industry . . . Nothing is more important than keeping equipment on the job, working at a profit . . . The time-proven Mercedes-Benz diesel engine works on the 4-stroke principle with a pre-chamber combustion process assuring greatest possible quietness and smokeless combustion even under changing loads . . . Maintenance is simple, fuel consumption low and minimum space is required for installation . . . Engines are now available in ratings from 36 to 1385 h.p. to power practically every machine.



**MODEL OM 312
79 h.p. at 2400 r.p.m.**

Other Mercedes-Benz diesels available in 12 and 20 cylinders, Turbo and Super-charged, up to 3000 h.p.

UTICA-BEND DIVISION

CURTISS-WRIGHT

CORPORATION • UTICA, MICHIGAN

ENGINEER'S FIELD REPORT

PRODUCT RPM DELO OIL

FIRM C. H. LAWSON, INC.

Using RPM DELO Oil heavy-duty engines outlast equipment



C. H. Lawson, Inc. operates 78 pieces of road building equipment ranging from new to 15 years old, all using RPM DELO Oil. Only one engine has ever required major overhaul and that was not due to lubrication. Firm's chief mechanic, E. C. Miller, says,

"RPM DELO Oil has been used exclusively in all our heavy duty engines since 1944. In many cases, it has enabled engines to outlast the equipment." Euclid Earth Mover (above) gets a push from a bulldozer to provide extra traction in wet earth.



TD 24 International (left), one of firm's 12 bulldozers, helps clear the way for a Route 50 by-pass at Riverdale, Maryland. This two year old tractor has operated more than 4,000 hours without engine repairs. Company owner, C. H. Lawson (right), reports that RPM DELO Oil keeps the engines in his equipment in such good shape that—regardless of operating conditions—they average approximately 4 years or 10,000 hours service before even minor repairs are required.



TRADEMARK "RPM DELO" AND DESIGN
REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey

Why RPM DELO Oils reduce wear—prolong engine life

- Oil stays on engine parts—hot or cold, running or idle
- Anti-oxidant resists lacquer formation
- Detergent keeps parts clean
- Special compounds prevent corrosion of bearing metals
- Inhibitor resists crankcase foaming



For More Information or the name of your nearest distributor, write or call any of the companies listed below.

STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA COMPANY, Denver 1, Colorado

**3rd ANNUAL
INTERNATIONAL
GAS TURBINE
CONFERENCE
AND
EXPOSITION**

**MARCH 3-6, 1958
SHOREHAM HOTEL, WASHINGTON, D.C.**

FOR EXHIBIT SPACE

**Covering all gas turbine applications,
component parts and accessories**

WRITE

**BARRY FREER
1300 Connecticut Ave., N. W., Washington 6, D.C.**

Sponsored By The

**GAS TURBINE POWER DIVISION
of the
AMERICAN SOCIETY OF MECHANICAL ENGINEERS
29 West 39th Street, New York 18, New York**

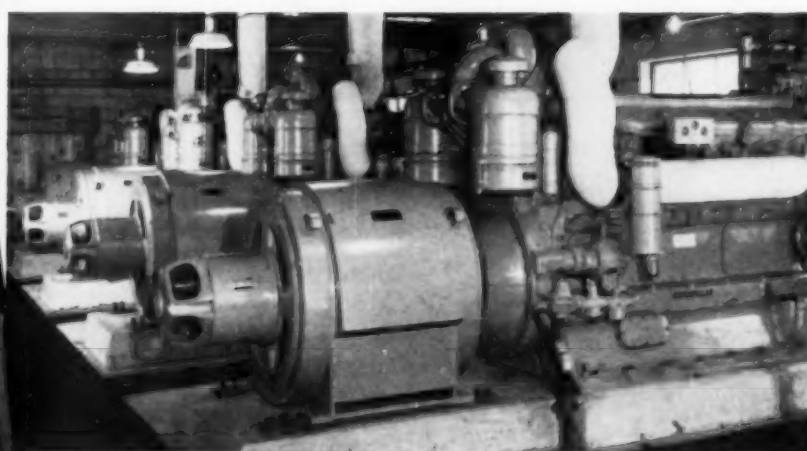
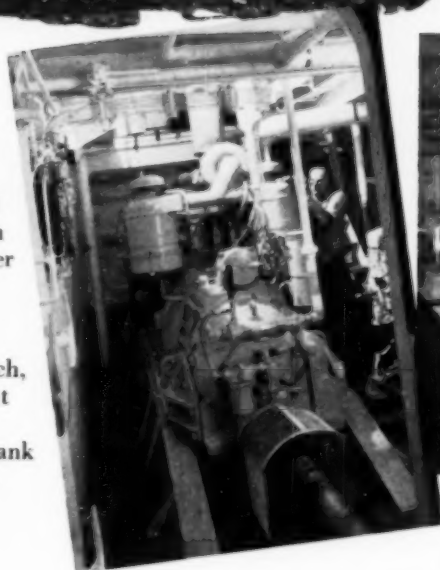
EARTHMOVING turbocharged diesel tractors set new records for yards of dirt moved per day, skid record loads of logs, clear roads, uproot mesquite with 14 ft. root plow, perform with sea-level efficiency up to 12,000 ft.



Caterpillar
built machines
up performance
with

AIRESEARCH TURBOCHARGERS

MARINE turbocharged diesel engines in the inland river towboat, *Papa Guy*, are rated at 490 horsepower each, allow the boat to tow two 20,000-barrel tank barges per trip.



POWER PLANT turbocharged diesel engines at the Barton Light and Power Plant in Vermont raise output more than 25% while decreasing fuel per horsepower hour, noise and smoke.

In every diesel application, AiResearch turbochargers have improved engine performance to an outstanding degree. The exceptional efficiency of their basic design and turbine wheels makes them the finest in the industry.

They provide the following advantages: increased power up to 100% depending on engine design and application; lower specific fuel consumption; lower engine thermal loading and less smoke and noise. AiResearch turbo-

chargers are air cooled, eliminating additional load on the cooling system and also eliminating complicated plumbing. Experience with thousands of units in the field proves their extreme reliability and durability.

• *Your inquiries are invited.*



AiResearch Industrial Division

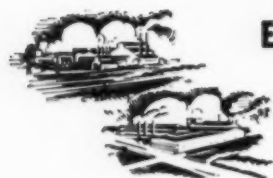
9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS

from the "Hub" of AMERICAN INDUSTRY
Steel Forgings—Steel Castings . . .
Unbiased design recommendations are yours for the asking

Unbiased design recommendations for the use of steel forgings, steel castings or both result from 85 years experience in their production at Erie Forge & Steel Corporation.

Not only do you have the advantage of this unusual dual production at the geographic hub of America's busiest industrial region . . . you also draw upon our design and engineering experience in specifying steel forgings, castings or combined assemblies for a wide diversity of industrial, maritime, and transportation equipment. Here your steel forgings and castings are produced from raw materials to finished product "Under One Responsibility and One Control." You will profit by consulting with us.



ERIE FORGE & STEEL CORPORATION
 ERIE, PENNSYLVANIA

MEMBER AMERICAN IRON AND STEEL INSTITUTE





New Kenworth 803-B rear dump truck
with Fuller 4-speed Transmission built
64-ton payloads.

KENWORTH'S *new mountain movers* *feature FULLER Transmissions*

Probably the largest rear-dump semi being built today, Kenworth's 42' 2½" rock and ore mover is equipped with a Fuller heavy duty 4-speed Transmission.

The 228,000 lb. gvw Kenworth 803-B is designed to haul top payloads profitably over varied terrain. It is powered by a single 12-cylinder diesel engine, offered in either the 400 or 600 hp range. In the 400 hp version, illustrated, a Fuller 4-speed

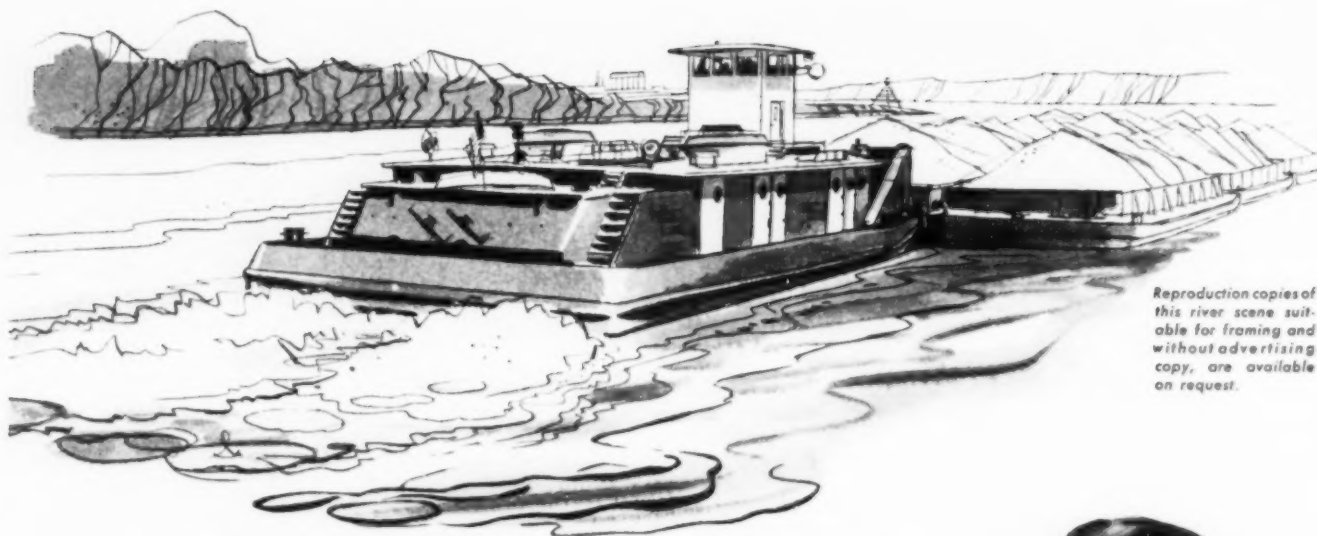
4-MS-1440 Transmission with CO-11,500 Twin Disc Torque Converter delivers power efficiently and effectively from the powerful Cummins NHV series engine. These heavy-duty Fuller Transmissions provide the right gear ratios to apply the power profitably.

More than 100 different transmission models are available for rubber-tired equipment from 100 to 600 hp, 330 to 1550 cubic inch engines. Check

with your truck manufacturer or write Fuller for the right transmission for *your* job.



FULLER MANUFACTURING CO. Transmission Division • Kalamazoo, Mich.
Unit Drop Forge Div., Milwaukee 1, Wis. • Shuler Axle Co., Louisville,
Ky. (Subsidiary) • Sales & Service, All Products, West. Dist. Branch,
Oakland 8, Cal. and Southwest. Dist. Office, Tulsa 3, Okla.



Reproduction copies of this river scene suitable for framing and without advertising copy, are available on request.

"You can count on the top-notch performance of Nordberg Diesels for the toughest kind of towboat service"

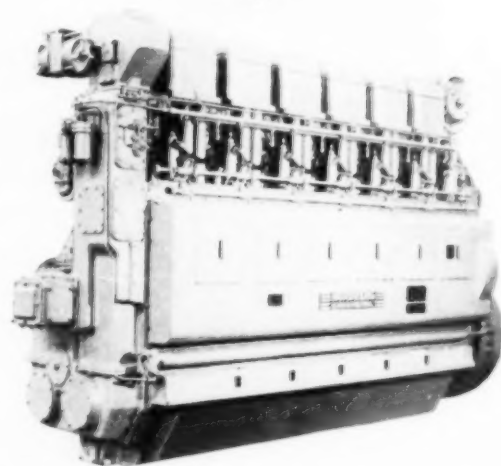
● In Towboat operations, Nordberg Marine Diesels are the logical choice for reliable, low cost main propulsion power . . . as evidenced by statements made by experienced owners and skippers who have learned to depend on the top-notch performance of these rugged engines.

To pay off in the towing business, a towboat has to keep on the move—putting its "push" behind all types of tows, under all kinds of river conditions—with no time out for uncertain engine performance or lack of maneuverability.

This is the kind of duty that's right up Nordberg's "alley" . . . for these powerful, quick-starting, responsive Diesels have what it takes to deliver round-the-clock "workhorse" towboat power and to fight the battles of "old man river." What's more . . . the low operating and maintenance economy of Nordberg Engines is a proven fact.

For the *best* in single or twin-screw power—put Nordberg to work in the engine room of your next towboat.

NORDBERG MFG. COMPANY, Milwaukee 1, Wisconsin



Typical In-line Supairthermal® Diesel engine for main propulsion. Nordberg builds both In-line and V-type four cycle marine engines in a wide range of sizes up to 4500 shaft horsepower. Write for literature.



3 dependable products for the diesel industry

DE LAVAL IMO PUMPS

De Laval IMO pumps do a dependable job during long years of service. The reason is IMO design simplicity. De Laval IMO's have only three moving parts—smoothly intermeshing rotors that propel the fluid axially in a steady flow without churning, pocketing or pulsation. There are no reciprocating parts to wear or become noisy. Quiet, compact IMO pumps are excellent for direct-connected, high-speed operation. They can be furnished in capacities to 1,000 gpm and pressures to 1,500 psig.

DE LAVAL HYDRAULIC FAN DRIVES

De Laval Hydraulic Fan Drives for air cooled heat exchangers and cooling towers offer these important advantages. They *save* power since the fan operates at full speed only a portion of the time. They provide *accurate, automatic* control of engine jacket water temperature, and also assure complete operational flexibility. These units stay on the job for years. As shown, both IMO motor and speed reducer are mounted and factory aligned on a single bedplate.

DE LAVAL HIGH PRESSURE TURBOCHARGERS

De Laval turbochargers offer pressure ratios of 3:1 as well as higher compressor and turbine efficiencies than those found in conventional turbocharger systems. Output of heavy duty diesel, gas and dual-fuel engines may be doubled by De Laval turbochargers without increasing thermal loading. Exclusive Monorotor design offers a compact lightweight unit of sturdy construction. De Laval turbochargers are self-adjusting to engine loads, can be used on 4- and 2-cycle engines.



You'll find additional data in these De Laval Bulletins. Write for your copies.



DE LAVAL

Steam Turbine Company

TRENTON 2, NEW JERSEY





**"Always plenty of power,
no mechanical trouble, easy on fuel—
I'm really sold on Allis-Chalmers engines"**

says Manton Jambon, skipper and co-owner of the "Black Orchid"



The 63-ft shrimp trawler "Black Orchid" has "plenty of power whether running or pulling in nets" delivered by its Allis-Chalmers 6 DASM-R-844, 275-hp, supercharged marine diesel.

"I've been around shrimp boats a long time," says Capt. Jambon, "but until I took over the *"Black Orchid"* a couple of years ago, I didn't know anything about Allis-Chalmers engines—and frankly I had to be shown. I just wasn't sold on an engine I wasn't familiar with. Well, now I *do* know something about an Allis-Chalmers engine, and I can tell you I am really sold! We've had no mechanical trouble, it goes easy on fuel, and there's always plenty of power, whether we're running or pulling in nets. And remember, I run this boat myself, so I know what I'm talking about."

Investigate the kind of engine performance Allis-Chalmers marine diesels give you. Find out about their big piston displacement that gives you *extra* usable power — true working horsepower on your shaft at speeds you can use. For complete information, see your Allis-Chalmers engine dealer or write direct.

BM-18

ALLIS-CHALMERS, BUDA DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS





NEW! Simpler housing and one-piece bearing reduce maintenance on Thompson Turbocharger

Designed for 10,000 operating hours under the severest operating temperatures and speeds. This means longer revenue runs between scheduled maintenance of the unit, and fewer unscheduled downtimes for repairs.

Turbine housing of the new Thompson Turbocharger is a heat-resistant alloy designed to eliminate corrosive attack and to be free from service cracks. Design also isolates high-temperature exhaust drive from bearing and air-side of turbocharger to increase maintenance-free life.

Bearing is one-piece design, mounted on small diameter shaft to reduce bearing surfaces speed even at high rpm.

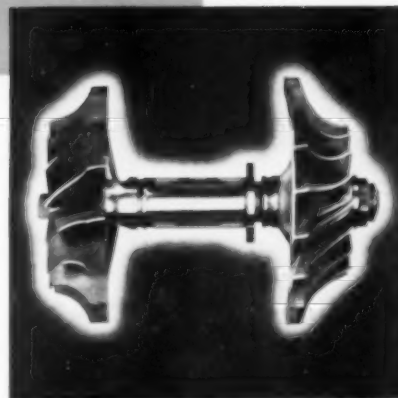
Design of impeller supplies supercharging air at equal compression ratios over a larger flow range and at lower rotor speeds than other turbochargers. Light-alloy rotor provides instant response to changes in engine speed and load.

Your blown diesel engines up to 300 horsepower can be readily equipped with new-design Thompson Turbochargers. Our engineers will help. When may they call?



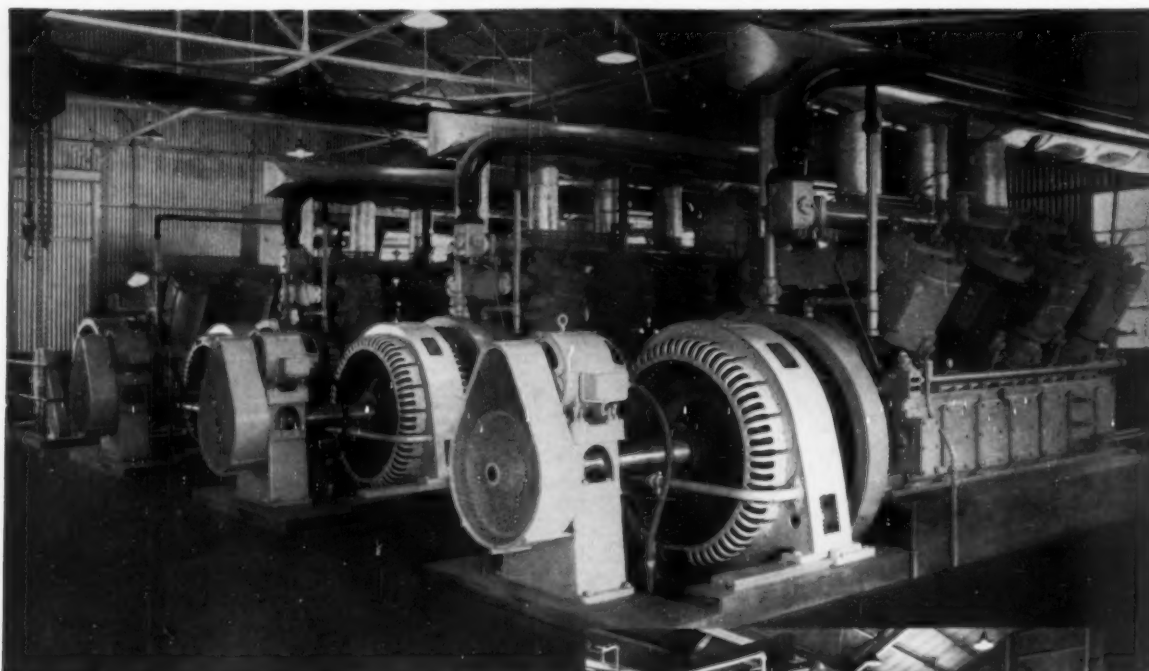
JET DIVISION
Thompson Products, Inc.

Cleveland 17, Ohio



Write today on your company letterhead for Booklet DPR-158 which contains technical data on Thompson Turbochargers for blown diesel engines up to 300 horsepower.

selected for **"extras"** at no extra cost!



Three Elliott 280-kw gas-engine-driven-generators serve a natural gasoline plant in Texas. Exciters, mounted on outboard bearings, are V-belt driven.



ELLIOTT generators

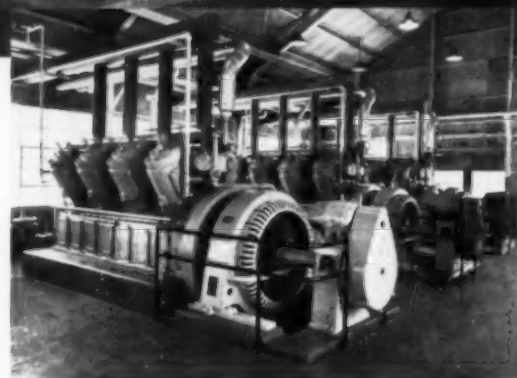
*extra strength, extra efficiency
extra long life plus less maintenance*

For more than 60 years, plant operators throughout the oil industry have benefited by Elliott "extras." There's a simple, logical reason why. The "extras" are designed into Elliott Fabri-Steel Generators in the first place. Crackproof strength of welded steel in frame and spider, electrically welded fabricated steel in stator and rotor, extra bracing of windings, and many other construction features add up to quality performance. Easy accessibility for routine cleaning and maintenance is another Elliott "bonus."

*For full details, ask your nearby
Elliott District Office for bulletin PB-2000, or write . . .*

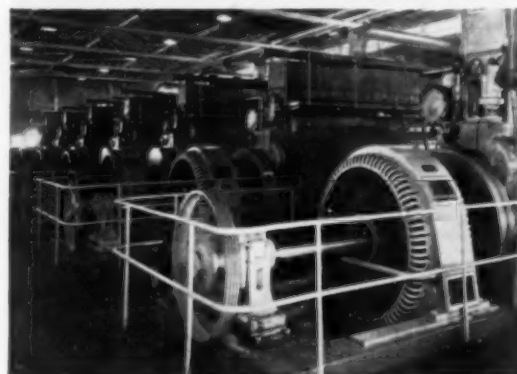


ELLIOTT Company
Ridgway Division • RIDGWAY, PA. R7-8A

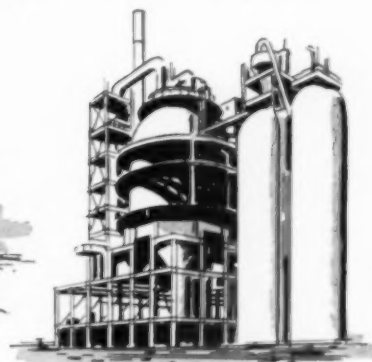
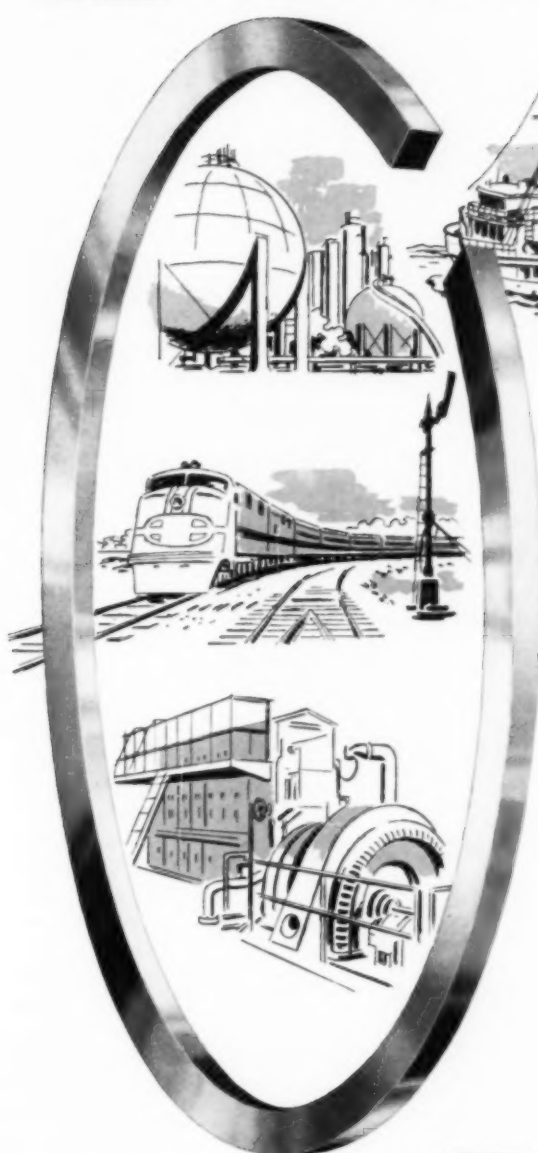


Here are three Elliott 312-kva generators which serve another gasoline plant in Texas.

Seven Elliott generators, rated 656-kva, serve this recently-built natural gasoline plant.



American Hammered Piston Rings . . . field-tested money savers!



Why not specify piston rings that have *proved* themselves? Koppers rings have been saving money and cutting costs for years—throughout the oil and gas industry, the marine industry, on major railroads, all over the chemical field, throughout the aircraft business, in municipal and industrial power plants everywhere—wherever you find gas, Diesel or steam engines, pumps, compressors, forging hammers—*wherever piston rings are needed!*

They're built to take it . . . designed to cut down-time and maintain high compression . . . give longer, more satisfactory service . . . save you money on fuel and lubricating oil . . . *and that's exactly what they do.* And Koppers rings are available in all types, all sizes—from $\frac{1}{2}$ " to 10' diameter—specifically designed for the job they will do in the field where they will be used.

Always specify American Hammered Piston Rings. Benefit from over 100 years of experience in metal products. Use Koppers' complete engineering and metallurgical staff. Get skilled analysis of your specific problem, and prompt assistance. For 16 page Piston Ring booklet write to: KOPPERS COMPANY, INC., Piston Ring & Seal Dept., 1401 Hamburg Street, Baltimore 3, Maryland.

METAL PRODUCTS DIVISION • KOPPERS COMPANY, INC. • BALTIMORE 3, MD. This Koppers Division also supplies industry with Fast's Couplings, Industrial Gas Cleaning Apparatus, Aeromaster Fans, Gas Apparatus.
Engineered Products Sold with Service



AMERICAN HAMMERED
Industrial Piston Rings

Michigan-Ohio News

By Jim Brown

HARRY W. Stoddard, former Detroit Sales Manager of Wolverine Tractor & Equipment Company has been elected a Vice President of the organization according to Tom McNutt, President. Mr. Stoddard is one of the original members

of the Wolverine Tractor organization having been with them in a sales capacity in the Detroit area since 1943.

THE City of Adrian, Michigan has accepted delivery on a model 427AWPD Pettibone Speed Swing Loader. Equipped with a GM Detroit Diesel, the new loader was purchased from Cyril J. Burke Inc. of Detroit and will be used

as a rehandling crane, a ditching machine and loader.

THE W. H. Knapp Construction Co. of Monroe, Mich. has purchased from Earle Equipment Co. of Detroit a model DAA 82A3E Allis Chalmers diesel generator set. The new generator set is rated at 85 kw and will be used to run a batch plant.

AMERICAN Ship Building Co. of Toledo, Ohio has purchased a 240 hp model HRS-6-M Cummins diesel from Cummins Diesel Michigan Inc. of Detroit. American Ship Building will use the new diesel in one of their workboats. The reverse gears are Twin Disc model MG-165 with a 3 to 1 ratio. The diesel has a completely enclosed cooling system and Cummins' new float tank—a small fuel day tank.

A NEW Austin-Western Super 99 grader equipped with an IH UD-14A diesel has been purchased by S. D. Solomon & Sons of Pontiac, Michigan. The grader was purchased from R. G. Moeller Co. of Detroit and will be used on a State Highway project near Clinton, Michigan.

THE City of Trenton, Mich., has recently purchased a Model 4150 GM Detroit Diesel generator set from Peninsular Diesel Inc. of Detroit. It has an 80 kw capacity and will be used as a standby generator set for the city's water station.

C. W. C. Excavating Co. of Manchester, Michigan has accepted delivery on a model HD-6B Allis-Chalmers crawler equipped with a hydraulic bulldozer blade. The sale was made by Earle Equipment Company of Detroit.

MR. CLIFFORD Stocks, of Rattle Run, Mich. has taken delivery on an Oliver OC-12 hydraulic bulldozer equipped with a Hercules 6 cylinder diesel. The Oliver was purchased from Cyril J. Burke Incorporated of Detroit and will be used for county drainage and general contracting work.

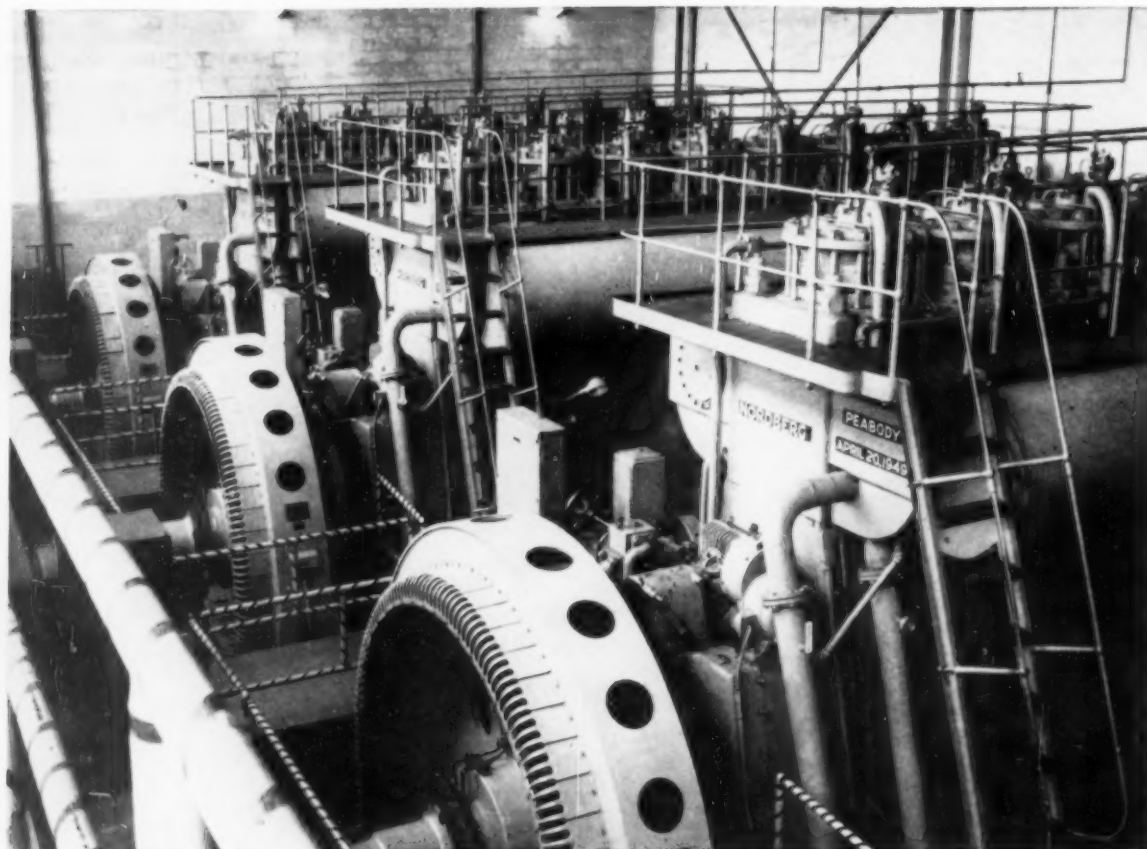
THE FORD Motor Company of Dearborn, Michigan has purchased a model H-6-BI Cummins diesel from Cummins Diesel Michigan Inc. of Dearborn, Mich. The new Cummins will be used to power a G. E. Locomotive at Ford's Rouge Plant.

WILLIAM J. Muchlenbeck of Saginaw, Michigan has purchased a Galion model T-600 Grade-O-Matic Motor Grader powered by an International Harvester diesel. The sale was made by the Detroit branch of Wolverine Tractor and Equipment Company.

WOLVERINE Tractor & Equipment Company of Detroit has delivered an International Harvester model TD-24 crawler to A. S. Lessler Gravel Company of Bay City, Michigan.

HYDRAULIC Concrete Breaking Co. of Oak Park, Mich. has a new GM Detroit Diesel model 3055C in their model 155 P & H shovel. The installation was made by Peninsular Diesel Inc. of Detroit.

 Look to **COOK** for Better Rings!



Peabody, Mass. Electric Company Swears by Cook Piston Rings!

Better Performance Since Installation of Cook Rings!

All three of Peabody Electric Company's 3200 H.P. Diesel engines are shown here. In 1956 these engines were required to operate 11,375 hours and generated 19,609,100 kilowatt hours. All three were equipped with Cook Piston Rings and gave

trouble-free performance throughout the year.

This record is a tribute to Peabody's excellent management and operating personnel—and to the outstanding quality of Cook Piston Rings. If you're looking for a seal with the savings built in, write direct for product information and the name of your nearest representative. Address: C. Lee Cook Company, 940 South 8th Street, Louisville 3, Kentucky.



**C. LEE
COOK
COMPANY**

Division of Dover Corporation

Rings and Packings Since 1888

CLARE Donaldson of Plymouth, Michigan has recently purchased a model LR T-6-P Cummins diesel. Rated at 450 hp with turbo charger, the new diesel was sold by Cummins Diesel Michigan, Inc. and will be used by Mr. Donaldson on a 12 in. gravel pump.

C & P Telephone Company of Charleston, West Virginia has purchased a GM diesel model 2051 ac generator set. The generator set has been mounted on a two-wheel trailer and will be used for a mobile, emergency power unit. The sale was made by Ray C. Call, Inc. of Steubenville, Ohio.

AN ALLIS-Chalmers model HD-6B crawler equipped with hydraulic bulldozer blade has been delivered to Mr. William Eddy of Ann Arbor, Michigan. The crawler was purchased from Earle Equipment Co. of Detroit.

THE Cleveland, Ohio distributors of Cummins diesels have recently installed a model JT-6-BI Cummins rated at 175 hp in a Compton Auger model 28. The customer is Ohio Auger Mining Co., Dexter City, Ohio.

STEVE Klochko Jr. of Detroit has accepted delivery on an International Harvester model TD-9 with Drott Skid shovel. Sale was made by the Detroit branch of Wolverine Tractor & Equipment Company.

A GRADALL powered by a model 3-71 GM Detroit Diesel has been delivered to Nelson Sharrow of Marine City, Michigan by Telford Equipment Company, Inc. of Detroit. The Gradall will be broken in on a sewer project for the city of St. Clair, Mich.

HILLIARD Drilling Company of Gladwin, Michigan has purchased two Cummins NHRS-6-BI diesels for a tandem unit to be used on a Franks drilling rig in the oil fields of northern Michigan. The Cummins diesels were purchased from Cummins Diesel Michigan Inc. of Detroit.

ED MARTIN Contracting Company of Brighton, Mich. has accepted delivery on a model TD-6 International crawler equipped with hydraulic bullgrader blade. The new crawler was delivered by the Detroit branch of Wolverine Tractor & Equipment Company.

Semi-Floating Shaft Couplings

Thomas Flexible Coupling Company, Warren, Pennsylvania, announces a new four-page brochure (Form No. 99) describing applications of their semi-floating shaft couplings. These couplings are used where the units are spaced apart and one bearing only is provided

for one of the units, such as engine-driven generators. Parallel misalignment is eliminated and only angular misalignment needs to be taken care of. This results in a very economical layout together with a saving in space. Radial loads such as V-belts, chains, generator or motor armatures can be supported without the use of pilot bearings. Combinations of full-floating and semi-floating

shafts are used to transmit power any given distance on long machines such as paper mills, printing presses, etc.

(ITS NEW)

Engine Shipped

Nordberg Manufacturing Company announces the shipment of a two-cycle Dualfuel engine to the Brownfield, Texas

municipal power plant. The engine has 10 cylinders of 21½ in. bore and 31 in. stroke and its rating at the installed elevation of 3312 ft will be 4630 bhp at 240 rpm. The General Electric ac generator will have a net rating of 3300 kw. This new engine, the third Nordberg to be installed since 1951, brings plant capacity to 13,580 hp, 9900 kw, an increase of 7500 kw in the last six years.

Profit-Paying WAUKESHA POWER FOR CRANES AND SHOVELS



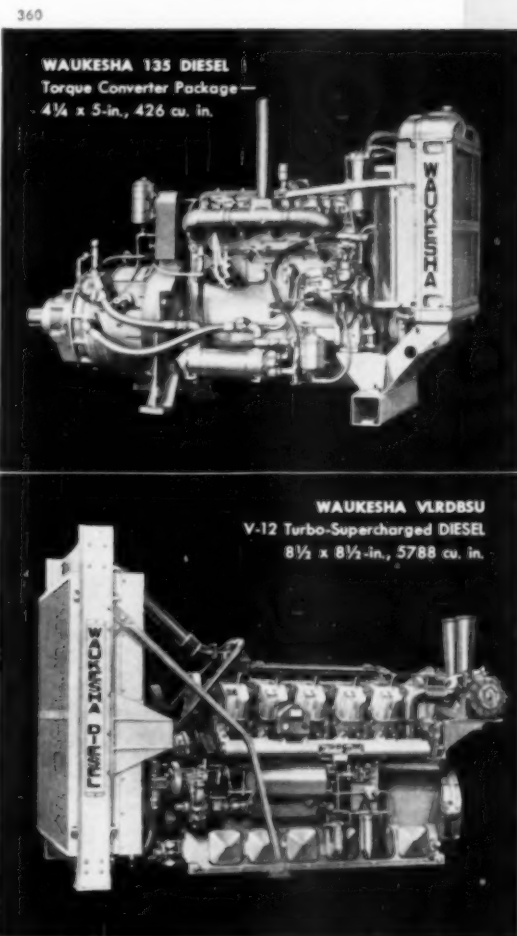
"QUICK-WAY"



BAY CITY



AMERICAN HOIST



Complete size range to 1235 hp... all standard fuels.

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN
New York • Tulsa • Los Angeles

Diesels on the World's Farms

By F. Hal Higgins

WILLEM de Lint of Holland won the World Ploughing Contest on a Fordson Major diesel tractor pulling a Ransomes Litrac plow at Peebles, Ohio, on Sept.

20, 1957. de Lint's score was 147.89. Fourteen nations participated, two contestants from each country: Belgium, Canada, Holland, Great Britain, Finland, North Ireland, Sweden, Norway, U. S., Germany, Italy, France, Denmark, New Zealand. Practically all contestants from abroad used diesel tractors. The Italians were on Fiat O.M. 45R's. The Germans rode a Normag-Porsche and a

Ferguson. One Swedish entrant was on a Volvo T.36 and his partner on a Farmall 400. The Finns had a Porsche and a Fordson. Northern Ireland, Denmark, Great Britain, Belgium as well as Holland entrants were all on Fordson Majors.

FIAT-OM farm and industrial tractors in 15 wheel and crawler models were

shown at the First Tractor Exhibition at Turin as the famous old Italian auto builder made its bid for a share of the world's farm and industrial tractor business. Wheel tractors start at 18 hp and crawlers at 60 hp.

THE British Land-Rover, the *Jeep* of that nation, has just completed a 1,000-mile test of its diesel model. Tests included both rugged highway and farm work. It developed 52 bhp at 3,500 rpm. An Allis-Chalmers All-Crop combine was pulled in grain harvest as one test. Road speeds up to 50 mph were made.

THE Nuffield organization announces a new 3-cylinder diesel tractor with B. M.C. engine. Drawbar horse power at 1600 rpm is 28. Parts are interchangeable with Nuffield's larger DM4 model, which is 5 in. higher.

GOVERNMENT of India has approved the building of the Ferguson 35 tractor by the Standard Motor Products of India, Ltd. There are claimed to be 10,000 Ferguson tractors in India. Ferguson is now a lusty unit in the Massey-Harris-Ferguson organization with factories in Canada, U. S., Australia and England with this more recent plant in India starting up. The diesel engine is more and more the standard power in these areas of high gasoline prices.

FORD is now building only diesel tractors at its British Plant, dropping the gasoline tractor after 40 years development during which it dominated the British Isles farming most of the time. Over 99% of Ford's output in England was diesel when the management decided it was time to drop the old style gasoline engine from its tractors.

TERHAL Farms, a 17,000-acre rice, grain, range land and wild game farming enterprise above Colusa, Calif., is equipped with a fleet of 14 diesel crawler tractors, 3 custom-built rice combines with GM diesel engines, a motor patrol road grader and a dragline. The tractors are International TD 24, TD18's, TD9's and Cat D8. Investment in tractors is put at \$147,000. If replaced today, they would cost \$228,500. Hence, the emphasis on skilled operators and ranch service shops to add years to the life of the tractors. Five diesel harvesters stood the farm \$160,000 more. Parts, supplies and labor for three full time shop men on the ranch add \$35,000 to \$50,000 annually.

EIMCO Corporation, Salt Lake City, has put its Eimco 105 through the Nebraska test. Engine in this model was a GM 71. Horsepower summary in this test was 77.86 maximum at sea level, and 72.2 observed maximum horsepower (tests F and G).

1ST FOR MID-AMERICA

TURBOCHARGED
2-CYCLE
CLEVELAND DIESEL



A GOOD PRODUCT
PLUS GOOD SERVICE
GIVES TOP PERFORMANCE

2700-H. P. M/V Eleanor Gordon —powered by two Cleveland Turbocharged 2-cycle Diesels

First towboat to be put into service by the Mid-America Transportation Company, Nashville, the new M/V ELEANOR GORDON hauls coal and general dry cargo on the Ohio and Mississippi Rivers.

Main engines in this modern 149-footer were designed and built by Cleveland Diesel—two Model 8-498 Turbocharged 2-cycle Diesels for a total rating of 2700 S.H.P. For the best return on your investment, pick Cleveland Diesel power for your work boat.



CLEVELAND DIESEL

Engine Division of General Motors • Cleveland 11, Ohio



SALES AND SERVICE OFFICES:

Boston, Mass., 1168 Commonwealth Ave.
Tel.: Beacon 2-1322

Chicago, Ill., 216 West Potomac Ave.,
Lombard, Ill. Tel.: Randolph 6-9214

Houston, Texas, 1 Main Street
Tel.: Capitol 7-3770

New Orleans, La., 727 Baronne St.
Tel.: Magnolia 6761

New York, N. Y., 10 East 40th Street
Tel.: Murray Hill 5-4372

Norfolk, Va., 614 Front Street
Tel.: Madison 2-7147

Pittsburgh, Pa., 469 Marlin Drive
Tel.: Locust 1-2173

Portland, Ore., 3676 S. E. Martine St.
Tel.: Prospect 1-7509

St. Louis, Mo., 2 N. Wharf St.
Tel.: Main 1-0642

San Diego, Calif., 1545 Meade Avenue
Tel.: Cypress 8-6051

San Francisco, Calif., 870 Harrison St.
Tel.: Douglas 2-1931

Seattle, Wash., 4300 11th Avenue, N.W.
Tel.: Hemlock 9000

Wilmington, Calif., 2724 Foreman Ave.,
Long Beach, Calif. Tel.: Terminal 4-4098

SHELL service on the big freeway job building around both sides of Walnut Creek, Contra Costa County, Calif., is covering the area like a blanket. The writer saw two shell tanker trucks moving from machine to machine with gasoline, diesel fuel and all the greases and lubes demanded by ditchers, scrapers, motor graders, tractors, compressors, loaders, pumps, pile drivers, cranes, etc., to be seen all over the area as the dirt is moved, bridges and grade separations built and paved.

THE Snowy Mountains scheme in New South Wales, Australia, is rated the biggest earth moving project going on in the world today by Esso Standard Engineers. The Snowy is a waste river that is being reversed to run in the opposite direction and go under a mountain to rich but semi-desert valleys to add a great farming empire to Australia's food producing potential. Both American and British diesels are on the job.

MORE than 2,700 soil conservation districts in the U.S. have programs with 15,000 district supervisors administering their programs. All their work has done much to save the top soil and rebuild worn-out farm lands via tractor power. The diesel tractor has played a big part in powering their programs on the land.

SOMECA'S 47 has gone through the Nebraska test with a sea level drawbar hp rating of 38.79. The engine in this French tractor is the O. M. Milano from Italy. There are indications that this tractor will be on the U.S. market soon.

VOLVO, the pioneer tractor of Sweden, and built by AB Bolinder-Munktel, appeared in its latest diesel model at the International Plowing Match at Peebles, Ohio, in September, last. The old Swedish firm was organized in 1832 and built its first tractor in 1913. The firm switched to diesels in 1952.

AED Meeting

A.E.D. will hold its 39th Annual Meeting at the Conrad Hilton hotel in Chicago from January 26-30. As in previous years all scheduled events of the Annual Meeting will be conveniently held at the Hilton. The Convention will present an outstanding business program. General business meetings will be open to both distributors and manufacturers with the four sessions featuring top-flight speakers, and panel discussions about current industry problems. All in all, it promises to be one of the most profitable weeks in the year for the construction equipment industry. There will be a full round of social events which will include the traditional Early birds breakfast, and A.E.D.'s Annual Birthday party.

Crankshaft Reconditioning Bulletin

This descriptive and illustrated brochure tells how diesel crankshafts are refurbished at National Forge & Ordnance Company, Irvine, Pennsylvania. Skilled workmen and engineers subject each worn crankshaft to the same rigid tests and inspections required of new crank-

shafts, and, should there be any question, a customer is advised of a crankshaft's salvagability. The latest techniques in metallurgy are employed in the heavy chrome plating of bearing surfaces to an oversize, prior to final grinding and polishing to dimension.

All reconditioning work is done to exacting standards—finished bearing sur-

faces must have a minimum of 85% bluebox fit and a surface roughness of not more than 10 micro inches. "Before" and "After" inspection charts prepared and sent to the client with every crankshaft carry a complete reconditioning history for future reference. Copies of this brochure may be obtained by writing National Forge & Ordnance, Irvine, Pennsylvania.

NEW! NEW! NEW! NEW! NEW!...



YOUR GUIDE TO MICRO-CLARITY OF DIESEL FUEL AND LUBE OILS

Now . . . in one condensed catalog . . . you have a quick reference to the complete line of Fulflo and CFC Filtration Equipment. Continuous micro-clarity means substantial savings through reduced wear on injectors and bearings, lower maintenance costs, prolonged engine life.

You'll find models for both fuel and lubricating oils — all sizes of stationary engines, mobile equipment, and for bulk filtration; for pressure or suction sections of fuel line; for high or low flow rates.

You'll see how Fulflo Filters, with exclusive Honeycomb Filter Tubes, provide true depth filtration with minimum pressure drop; how their wide range of controlled densities enables you to achieve any degree of continuous micro-clarity.

You'll read about CFC Honan-Crane Filters for by-pass applications, surface full-flow filtration, and removal of dissolved as well as solid contaminants. Low-cost CFC Michiana Filters, with "throw-away" or replaceable elements, are also described.

And you'll find that the complete engineering facilities of Commercial Filters Corporation are at your service. Send today for your free catalog.

COMMERCIAL FILTERS CORPORATION


MELROSE 76, MASSACHUSETTS
PLANTS IN MELROSE, MASSACHUSETTS AND LEBANON, INDIANA

MICRO-CLARITY AT MINIMUM COST

COMMERCIAL FILTERS CORPORATION
Dept. DS
2 Main Street
Melrose, Massachusetts

Please send me your free catalog on Fulflo and CFC Filtration Equipment.

Name _____
Title _____
Company _____
Street & No. _____
City & State _____



AN ENGINE AS MODERN AS TODAY

The ALCO 251 diesel is modern for good reasons. The first: To save you money. ALCO engineers designed this engine with up-to-date materials, lowering maintenance and slashing weight. Through modern turbo-charging and fuel injection they endowed it with more horsepower — reliable horsepower — to drive pumps, compressors, generators, shafts efficiently and economically.

All this means that you can install ALCO engines inexpensively. Heavy costly foundations, grouting, are unnecessary. It means, too, that maintenance costs are lower because modern materials wear longer, and the 251 diesel's design lets your maintenance people get into the engine faster. Replacement parts are readily available from ALCO's six regional warehouses.

ALCO can tell you much more about how the 251 diesel compares to "cast-iron" engines. Contact your nearest ALCO sales offices, or write Transportation Products, Dept. TR-5, P. O. Box 1065, Schenectady 1, N. Y.

Condensed Specifications* for ALCO 251 Diesels

No. Cyl.	Bore and Stroke (in.)	RPM Range	BHP Range	Approx. Wt Dry (lb)
6	9 x 10½	350-1000	550-900	22,100
12	9 x 10½	350-1000	1100-1800	32,650
16	9 x 10½	350-1000	1470-2400	42,000

*DEMA standards

ALCO

ALCO PRODUCTS, INC.

NEW YORK

Sales Offices in Principal Cities

*Locomotives • Diesel Engines • Nuclear Reactors
Heat Exchangers • Springs • Steel Pipe • Forgings
Weldments • Oil-Field Equipment*

A PAIR OF FLORIDA YACHTS

By ED DENNIS

FLORIDA, with its warm climate and proximity to some of the finest fishing and cruising waters in the country, has become the nautical proving grounds for the rest of the states. Its unique combination of the nation's longest coastline, of approximately 715 miles, and over 25,000 lakes plus an unmatched all year climate, has put this "Sand and Sun" state way ahead in the lead of boating.

Many of Florida's boat builders are known the world over for their design and type of construction. Utilizing the best of materials and boat building know-how, they have developed and improved hull and cabin design, that, combined with top engineering ideas from the nation's leading marine diesel engine manufacturers, make Florida a Mecca for yachtsmen.

Every day, summer and winter, all paths lead to this vast armada of vessels swarming over the length and breadth of the state's waters, from Key West in the south to Fernandina Beach in the north and over to Pensacola in the northwest. Yes, while the Yankee in the North is shoveling snow, the Floridian is cruising on sun kissed waters.

The *Osprey II* was built and launched in the Sunshine State at the Huckins Yacht Corporation's fully equipped yard in Jacksonville, Florida. It has just recently been repowered with twin General Motors turbopower 300 hp diesel engines installed aft.

This 52 footer was built with magnificent styling, sleek and streamlined she cuts the blue Gulfstream waters at a top speed of 28.2 miles per hour and

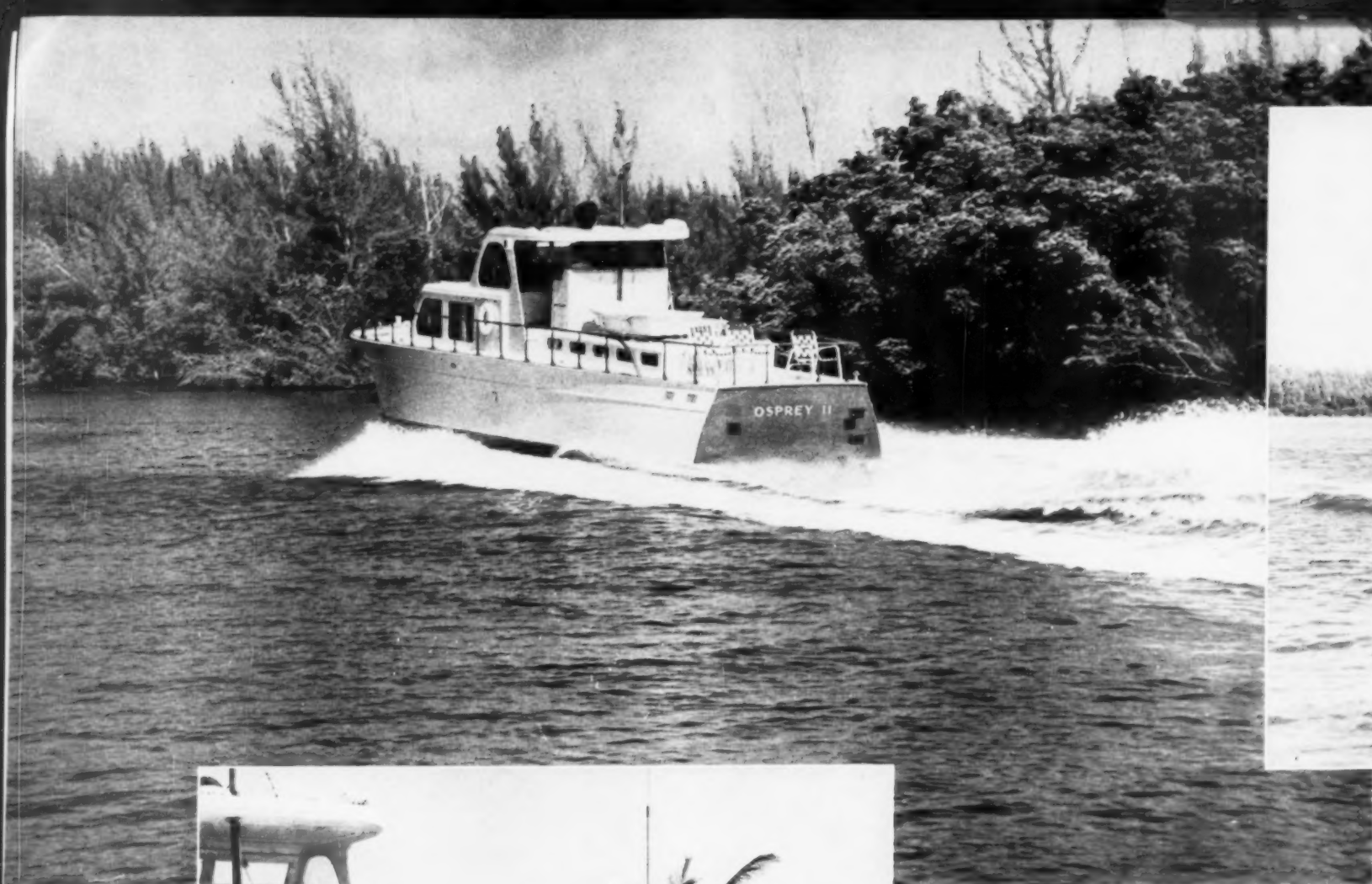
cruises a nice comfortable 24. In the *Osprey II*, the designers have created a blend of modern styling, comfort and high speed.

The spacious interior incorporates such luxuries as a stainless steel and formica galley and a dinette arrangement that converts into twin berths. Accommodations, besides the roomy salon, are the owners' stateroom for two which includes shower and toilet and the guests quarters with two berths.

The newly installed Detroit Diesel turbopower diesel engines are basic 6-71 series having a bore of 4 1/4 inches and a stroke of 5 inches with a piston displacement of 425.6 cu in. The addition of a single-stage exhaust driven turbine to this efficient 2 cycle diesel engine has given this 71 series a horsepower rating up to 300.

The *Osprey II* owned by the Collins Radio Co. which was recently repowered with two G. M. turbocharged 6-71 General Motors diesels rated 300 hp at 2300 rpm by the Ellis Diesel Sales & Service Co. of Ft. Lauderdale. It calls De Padro Yacht Basin, Dania, Fla. its home port. It is shown during its trial run near Ft. Lauderdale.





L to R, Harold Ellis of Ellis Diesel Sales & Service of Ft. Lauderdale, Fla. who engineered the G. M. installation and Capt. O. C. Greathouse discussing the diesel engines performance and the maneuverability of the *Osprey II* after its trial run.

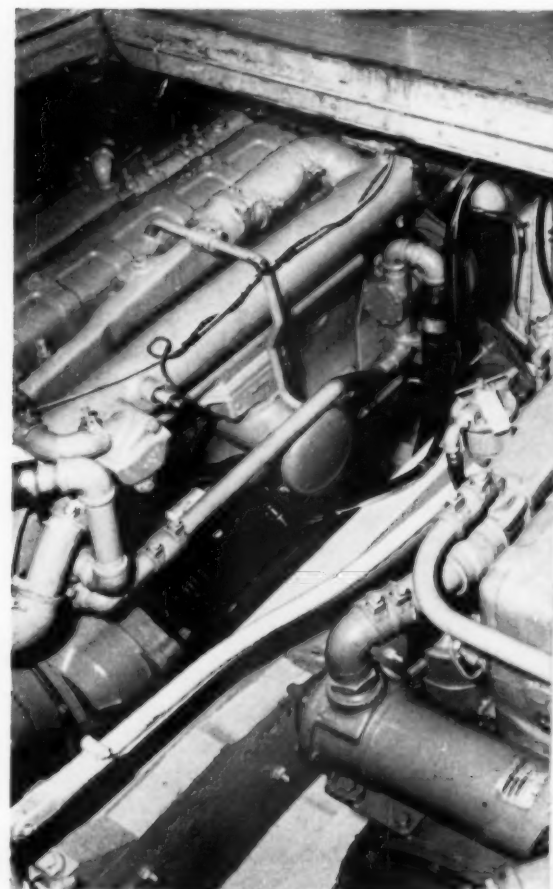
The diesel engines, installed aft, transmit their power through Allison direct hydraulic gears to Huckins 1.5:1 "V" drive to the 23x23 3 bladed propellers which gives the vessel a cruising speed of 21 mph at 2000 rpm and a top of 28.2 at 2300 rpm.

The *Osprey II*'s modern bridge has been equipped with the finest and latest equipment. Included are a Bendix direction finder and Fisher ship to

shore radio telephone and other navigational equipment befitting a vessel owned by the Collins Radio Company.

And at Palm Beach, the luxury resort, you will find the *Reverie* a 40 footer owned by Mr. W. W. Attebury of that city. The vessel's long low running lines combines the comforts of an enclosed cruiser with open roominess of a sportsfisherman.

Stern view shows the *Osprey II* going north on the inland water way between Ft. Lauderdale and Dania Florida.



DIESEL PROGRESS



The 40 ft *Reverie* owned by W. W. Attebury of Palm Beach, Florida, on her trial runs in Biscayne Bay. Repowered from gasoline engines to a pair of model 6DAMR273 Allis-Chalmers diesel engines which drive a pair of 22x22 Federal propellers through Snow Nabstedt 2.5:1 r&r gears gives the vessel a cruising speed of better than 10 knots. The diesels were engineered and installed by the J. Frank Knorr Co.



A side view of the *Reverie* with her 12 ft beam and 40 ft overall. The vessel is owned by W. W. Attebury of Palm Beach who is connected with the "Perry" newspapers of Florida.

The two newly installed Allis-Chalmers (Buda) diesel engines which dropped the fuel consumption to almost one third of the former gasoline engine use. These model 6DAMR diesels deliver 76 hp at 2000 rpm, have a $3\frac{1}{4}$ bore by a $4\frac{1}{8}$ stroke with a 273 cu in. displacement. The dimensions, with the S. N. mechanical 2.5:1 r&r gears, are overall length $55\frac{1}{2}$ in., width 21-24 in., and height above the crankcase 21 inches. Installation included Cuno and Fram fuel oil filters. J. Frank Knorr of Miami supplied the engines.



The Ross heat exchanger, Snow-Nabstedt 2.5:1 r&r gears; Fram lube oil filter and American Bosch Fuel oil injectors on the *Reverie*.

Designed for family cruising and living aboard plus open sea fishing and the gracious entertainment of guests, this Allis-Chalmers dieselized yacht is used by Mr. Attebury for Florida coastal and tropical island cruising.

In addition to two twin berth cabins complete with toilets and showers, the *Reverie* has a small but very complete galley and a lounge where the ships controls are, plus a large open cockpit for sports fishing.

The *Reverie* is powered with twin Allis-Chalmers (Buda), model 6DAMR 273, diesel engines developing 76 hp at 2000 rpm transmitting their power through 2.5:1 Snow-Nabstedt reduction gears to give the craft a cruising speed of 10 knots. The engineering and installation of these new light weight diesels was supervised by the J. Frank Knorr Co., Miami. The engines are equipped with Ross heat exchangers and Fram lube oil filters, the fuel oil filters are from Cuno and Fram, the shaft is of $1\frac{1}{2}$ monel metal and the 22x22 propellers are Federal Equipoise.

Each of the two 100 gal. fuel oil tanks have a Fullflow fuel oil filter mounted near the discharge line for clean fuel going to the engine inlet lines.

This distinguished 40 footer is equipped with the latest navigational equipment such as Automatic pilot, R. C. A. marine ship to shore telephone and an automatic launching dinghy mounted on the cabin roof. Since it was repowered from gasoline engines to diesels, the fuel consumption has dropped to one third of its former consumption.

CONTINENTAL AIR DEFENSE RELIES ON DIESELS

By DOUGLAS SHEARING

SHROUDED in secrecy, a large windowless building was recently completed at a key military base in the United States. It is one of many identical structures now being built at bases all along the perimeter of the country. These ominous looking blockhouses do not reflect any of today's modern architecture but they do contain the sensitive components of a very modern electronic air defense system. Windows are unnecessary and actually unwanted in these structures. The highly trained Air Force men inside, have radar and voice communications with a vast network of observation posts. These men are only interested in objects thousands of miles away and thus have no need to see their outside surroundings. Their world, while on duty, is the dull blink of a radar contact as it moves slowly across the luminous face of a radar receiving set. The rooms in which they work are bathed in either a soft blue or a yellow light. This contrast is necessary to enable them to distinguish each "contact" as it appears in the window to their world. These slowly moving blobs of light, blinking with each sweep of a distant antenna, are in reality jet aircraft screaming across the sky at speeds in excess of 600 miles per hour. One of them could be carrying the nuclear bomb that could destroy your world in one searing blast of unimaginable force.

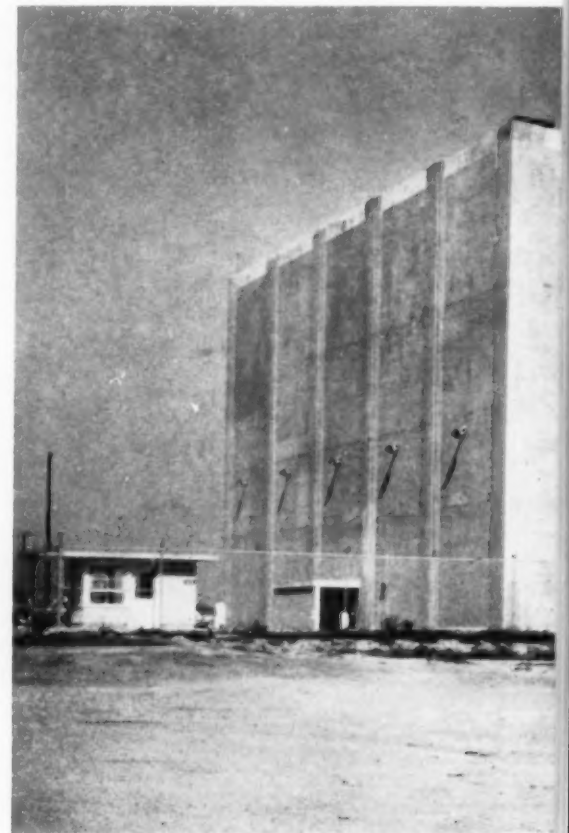
The complex air defense system housed in this ring of windowless blockhouses is called SAGE, an abbreviation for Semi-Automatic Ground Environment. This means that the system is monitored by humans and is concerned with the destructive

threat of enemy bombers. The actual function of SAGE is to collect, sort and memorize the thousands of facts about aerial activity that are gathered by a vast network of observation posts. It can identify the planes and compute their speed, altitude and direction. These facts are summarized and presented so clearly, that the Air Force Officers at CONAD, Continental Air Defense Command Headquarters, are free to concentrate entirely upon making the decision—when and where to intercept the planes, if they are hostile. The amazing electronic equipment which makes this system possible was developed by Lincoln Laboratory of the Massachusetts Institute of Technology with the cooperation of numerous manufacturers of electronic equipment. Western Electric Company is the prime contractor for the construction of the buildings and installation of all necessary items of equipment. This included large quantities of many varied items of equipment as each blockhouse is a self-contained unit with its own independent power source. Electric power is the most essential item in this humming, blinking, glowing maze of supersonic speed tracking and computing equipment. Each station is equipped with six diesel engine-generator units. A firm capacity safety factor of 2.5 assures adequate power always. The operation of each engine is monitored by electronic alarms which sound a warning of any trouble and cause another engine to be automatically started up as a replacement.

Each of the various stations is being built by a general contractor. Burns & Roe Inc., New York

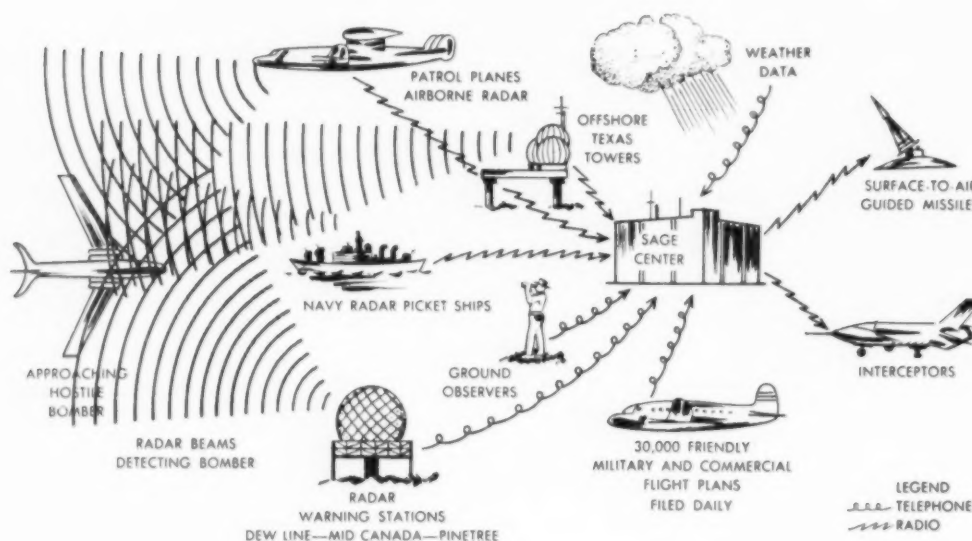
are the Consulting Engineers for the construction of the blockhouses and Western Electric has coordinated the delivery of the engine-generator units with the construction progress at each site. Thirty-six (36) Nordberg in-line diesel engines are being installed at six of the stations at this time. The four-cycle type engines were built at the St. Louis plant of Nordberg on practically an assembly line basis. Each engine has six cylinders of 13" bore and 16 1/2" stroke. After being perfectly balanced, each engine was test run under various load conditions prior to shipment. The supercharged Nordberg engines are rated 930 hp at 450 rpm. Each SAGE station has an IBM computer which contains 123 miles of wire and 58,500 tubes to keep it memorizing and clicking off vital facts as they are needed. The Electric Products

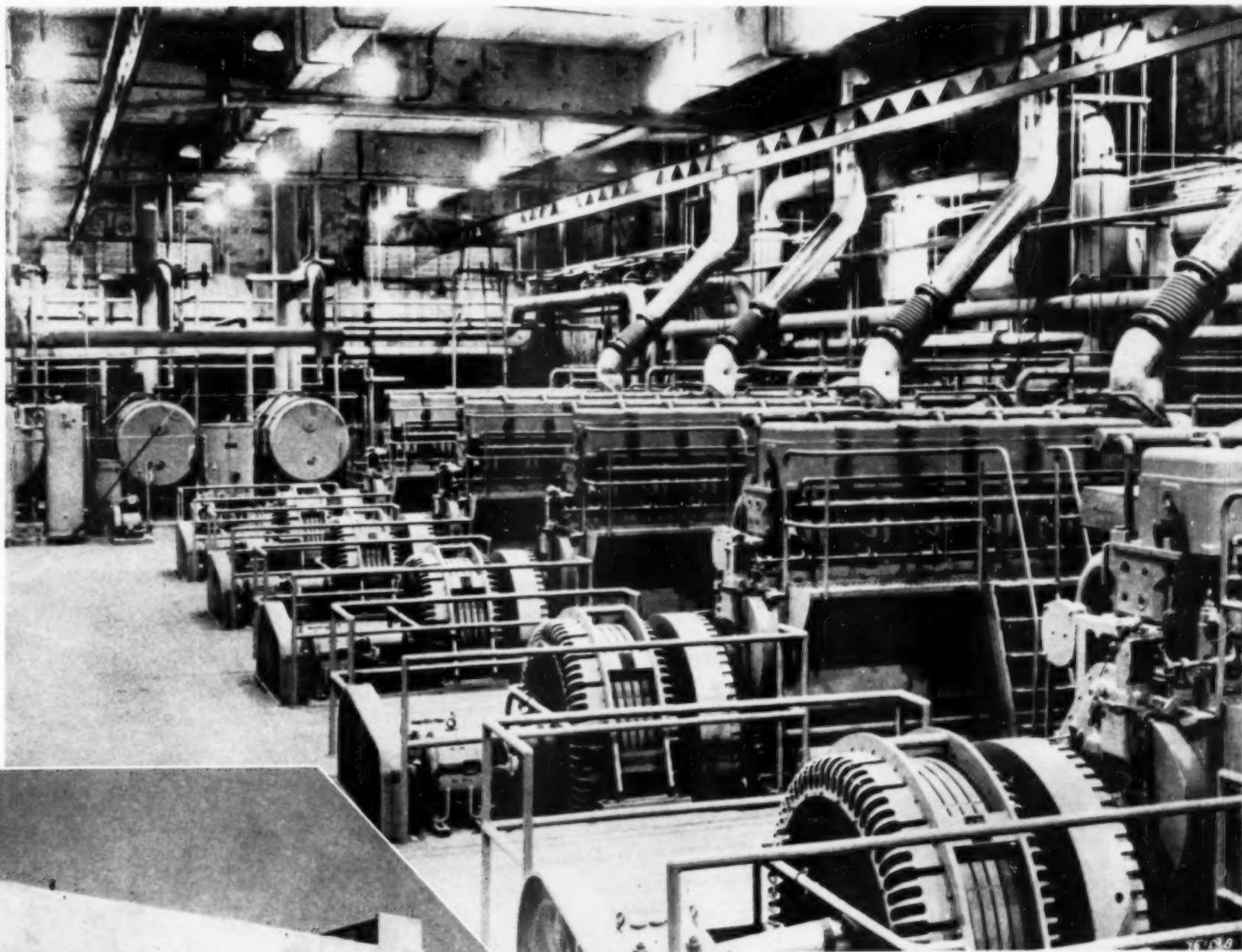
This large, ominous looking building is one of many SAGE Direction Centers that have been built along the perimeter of the United States. Each Center contains the sensitive electronic components of this modern air defense system and its own diesel-electric generating units.



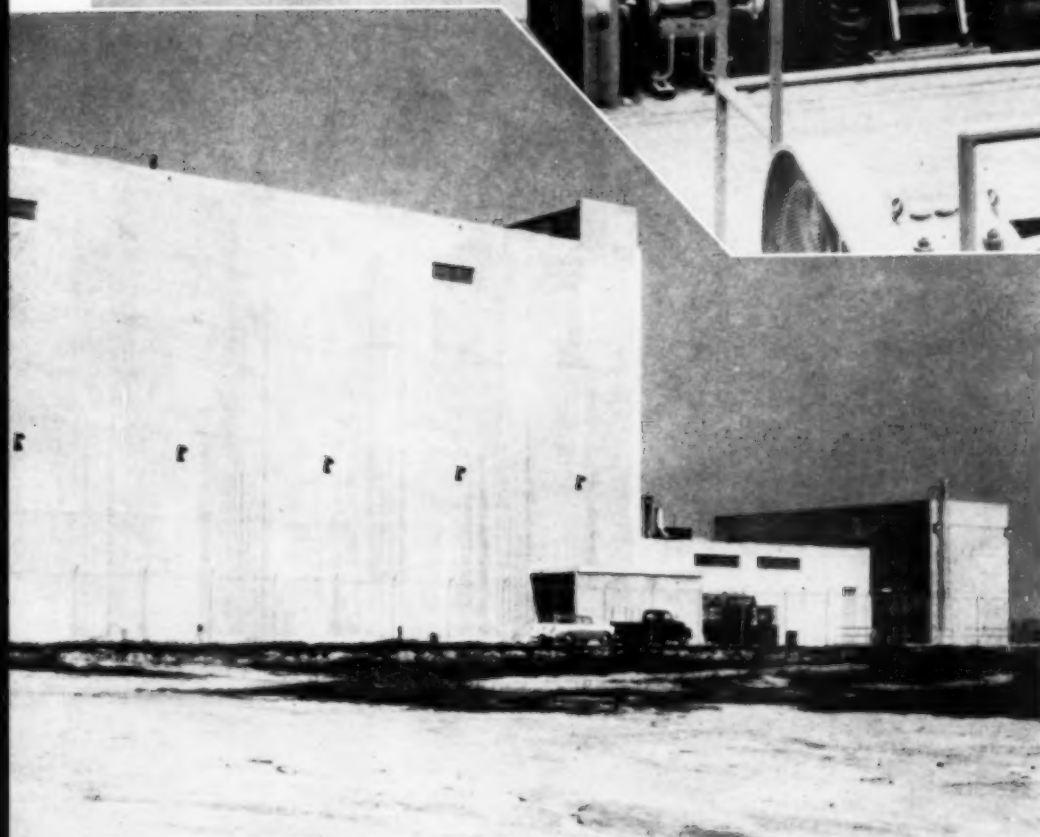
Company generators produce 650 kw of 480 volt, 3 phase, 60 cycle alternating current for the computer and the many radar sets, plotting boards, radio equipment, lights, etc. All of the engine con-

Sketch showing radar warning network, flow of facts to SAGE Direction Center and transmission of orders to defense units.





Five of six Supercharged Nordberg Diesel engines which drive Electric Products Company generators in a SAGE Direction Center somewhere in the United States. Each of these four-cycle, six cylinder engines is rated 930 hp at 450 rpm. ➤



trols and switchgear were furnished by General Electric Co. for this entire installation. Now that the northern radar warning networks are complete, the air defense system of continental

United States is capable of detecting hostile aircraft when they are a considerable distance from our own borders or shore. Once a plane has been designated hostile by CONAD, SAGE again takes

over to "scramble" our interceptor planes and send out a beam which the interceptors automatically follow to the attack point. It also keeps track of their fuel consumption and scrambles other planes to relieve each group of interceptors before their fuel supply runs too low. Completion of the SAGE System will mark the culmination of a multibillion dollar expenditure by the Defense Department to provide an adequate warning and air defense system against hostile bombers. From the pulsing radar antenna strung along the Arctic wasteland to the Diesel engines in the depths of ominous looking blockhouses, dependability was an important factor in selecting equipment for each installation. This equipment and the dedicated men of our Armed Forces are on the job 24 hours a day, alert for any attack and prepared to intercept it well beyond our borders.

JANUARY 1958

29

POWERFUL TUG *ST. REGIS*

**Fifty Seven Footer Driven by 445 hp
Cummins Turbocharged Diesel Works
Efficiently and Economically in Swift
Waters of The St. Lawrence River**

By ARNOLD B. NEWELL

THE new tug *St. Regis* is performing herculean tasks on the St. Lawrence Seaway in connection with the construction of a permanent stone barrier to divert the swift river current away from

The tug is owned by A. S. Wikstrom, Inc. of Skaneateles, New York, who specializes in performing the more difficult construction jobs and is active in this class of work throughout the eastern part of the United States. They frequently work where there is a combination of water and land to



the end of a canal now being built. Although the boat is only 57 ft long, 17 ft beam and 8½ ft depth of hull, it is a very powerful one. The engine is a Cummins equipped with two turbochargers. Its full rating is 600 hp at 2100 rpm. Installed in the *St. Regis* and operating at 1800 rpm it has a serv-

ice rating of 445 hp with substantial power reserve if needed. It is equipped with a Capitol reverse and reduction gear with 4.5:1 reduction ratio and drives a 4 blade bronze wheel 60 in. diameter and 40 in. pitch. The engine was supplied by Cummins Diesel Central New York Inc. of Syracuse.



cope with. On the Seaway they are building a mid-stream stone barrier resembling a breakwater at the upper end of Cromwall Island in the St. Lawrence. At this point the island divides the river causing swift swirling cross currents to flow toward land on the American side where a navigational canal is being built. The stone barrier will divert the current in a manner to prevent its future interference with ship movement into the canal.

The method of construction is to drop B-size stone into the river to form a broad base with tapering sides rising to a height of 10 ft below the water level and then face it with A-type stones weighing three to eight tons each. The stone is quarried on land and loaded on barges which are towed out and spotted in place by the *St. Regis* and then unloaded by a bulldozer on deck. The larger stones are picked up by cranes and placed as facing and retaining surface to break the brunt of the river

current and prevent dislodgement and distribution of the smaller rocks. The *St. Regis* pushes a barge attached to the bow. The loading point on the mainland to the project in the river is a distance of about 1,000 ft. The *St. Regis* shuttles back and forth continuously in this service where fast powerful maneuvers and excellent steering control are essential. Although barge loads are not heavy, conditions of navigation are difficult and high power is needed. Depth of water being navigated limits the draft and therefore the propeller diameter. Since prime emphasis is placed on towing ability the propeller is designed for a speed running free of 10 mph and not greatly affected by towing the barge. High volume of tonnage moved is achieved by many quick trips over the course.

To operate efficiently in this class of service the tug must have a sturdy well built hull of good design and construction. To this end it was built by the Seaboard Structural Steel Division of A. S. Wikstrom, Inc. at Wilmington, Delaware. The hull with ample deadrise and good sheer is high enough at the bow for push towing and low enough at the stern to be handy when working with a tow astern on hawser. There are two half round guard

rails running full length and a half-guard at the bow near the water line. The superstructure is a trunk type deckhouse and pilothouse. Limited quarters are provided below deck in addition to the compact machinery installation amidships. The raised pilothouse provides good visibility while towing and handling barges. There is ample deck space forward of and abaft the substructure with grab rails for safety in bad weather. Bulkheads 18 inches high are carried full length around the deck with sharp inboard slope at the stern. The hull underbody is rounded in shape with a conventional skeg. A large counterbalanced rudder is provided for quick easy steering by hand.

The machinery installation is quite simple as the Cummins engine is fully equipped with all pumps and accessories essential to its operation. An inboard closed cooling system employs a heat exchanger. Each bank of cylinders is equipped with a Cummins turbocharger. The well known P-T fuel injection system is employed. Pilothouse control is through the medium of a Morse hydraulic system. The starting system is 32-volt electric. The auxiliary generator is a 5 kw Sheppard unit. Two lube oil filters are used. One is a Luberfiner by-pass filter and the other is a Commercial Fullflow unit. There is ample space around and above the engine and adequate provision is made for routine maintenance work. The pilothouse with mahogany trim and drop windows is at present equipped for inland work only. There is a 5 in. dial compass, searchlight and air horn. For hand steering a 48 in. mahogany pilotwheel is used with $\frac{3}{4}$ in. plow steel cables leading thru pipes to the steering quadrant on the stern. Bitts at the bow and stern are made up of 8 in. welded pipe. The owners report that they are very well pleased with the performance of the *St. Regis* which handles well and out-pulls some of the more powerful tugs working on the river. She is on a 6-day per week work schedule.

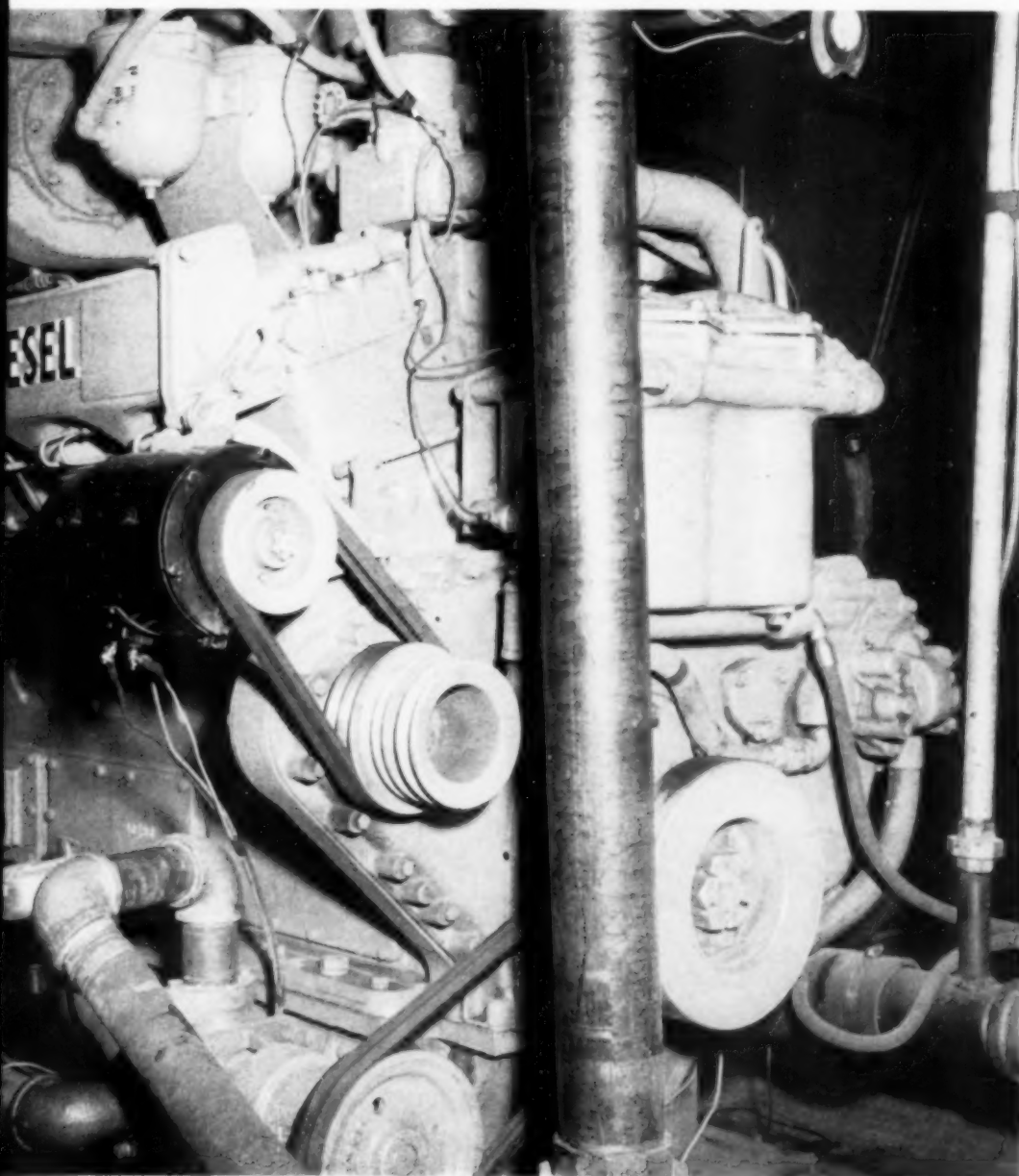
Although the tug was built to meet the immediate needs on the St. Lawrence Seaway, its design, construction and powering is such that it will be well suited to use on future contracts. It is well heated and comfortable and the quarters can be equipped for the crew to live aboard with simple additions to the present facilities. Similarly, additional aids to navigation can be installed if the *St. Regis* is placed on open water where they are needed.

The tug is of trim appearance, maintained in spic and span condition with black hull and white deckhouse. It is obviously capable of working under more arduous conditions sea and weather wise and will prove to be a good all round help to the owners wherever it may be used.

List of Equipment

Engine	Cummins VT-12-M 600 hp at 2100 rpm
Reverse & Reduction Gear	Capitol
Turbocharger	Cummins Model T-590
Mechanical Control System	Morse
By-pass Filter	Luber-finer
Lube Oil Filter	Commercial Fullflow

The turbocharged 600 hp Cummins installed on the *St. Regis* with Luberfiner by-pass filter and Commercial Fullflow lube oil filter.



THREE HUGE OFFSHORE SUBMERSIBLE RIGS

By DOUGLAS SHEARING



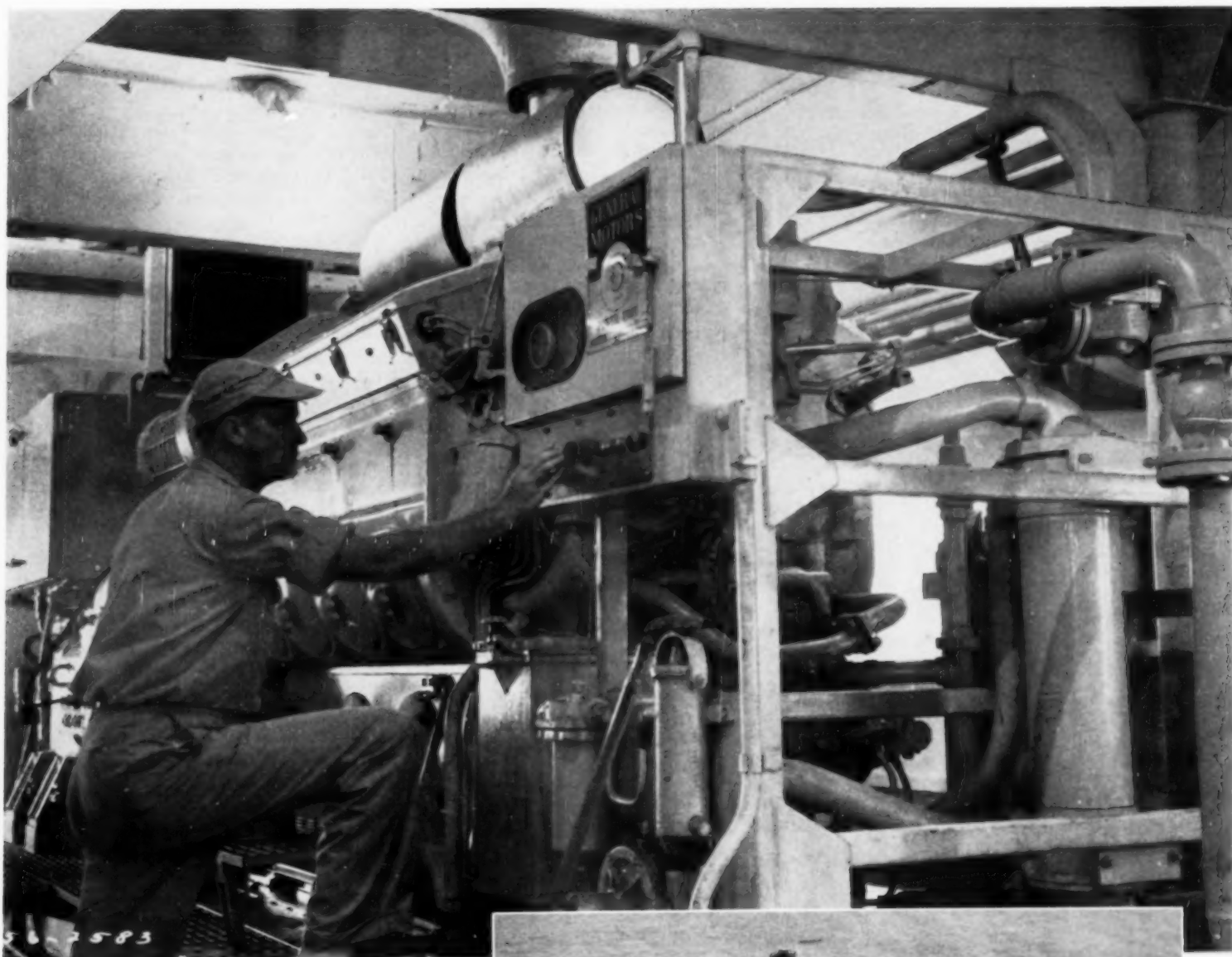
Kermac Rig 47 drilling in 60 feet of water off the Louisiana Gulf Coast.

THREE huge offshore submersible rigs of an advanced design developed by the marine engineering department of Kerr-McGee Oil Industries, Inc., are now in operation on the U.S. Gulf Coast. Two of these, Rigs 46 and 47, are in use by Kerr-McGee, and one is operated by Blue Water Drilling Corporation. New features utilized on these new drilling devices are: (1) A raft-type "hull" of 14½-foot diameter steel tubes. (2) A movable derrick substructure projected beyond the end of the barge, drilling beside the hull rather than through a slot. (3) A 125-ton mast which can be tilted as a construction boom to wells without hiring a derrick barge.

Base of the drilling barge consists of tubular steel members 14½ feet in diameter welded into a rigid grid pattern 202 feet wide and 242 feet long. After being towed to location the device is submerged to the Gulf floor by flooding the tubular steel base. The drilling floor substructure sits on two huge steel beams which extend 55 feet beyond the end of the barge proper. The substructure can be moved forward and sideways for a combination

of six holes from a single barge location. The rig features a 151 foot full view drilling mast. This design eliminates need for a slot in the barge hull, as found on earlier submersible rigs; thus, when drilling equipment is moved, there is no danger of damaging wellhead protection equipment. The rig is stabilized by massive steel columns situated vertically at each of the four corners. The 100 foot high columns are cylindrical to a height of 64 feet, beyond which they taper in a conical shape to a five-foot diameter at the top. Set atop these corner supports, the working platform is further stabilized by 22 steel columns. Twenty of the steel columns are 42 inches in diameter; the other two are 48 inches. New safety features of the rig are the enormous weight (5,000 tons when submerged) anchoring it firmly to Gulf floor, and the extreme width and length which keep it from turning over; at a shallow angle of tilt one side would touch the bottom. On one edge of the deck is a steel structure housing air-conditioned crew quarters, dining, office and recreational facilities. The top of the house provides a landing port for a helicopter.

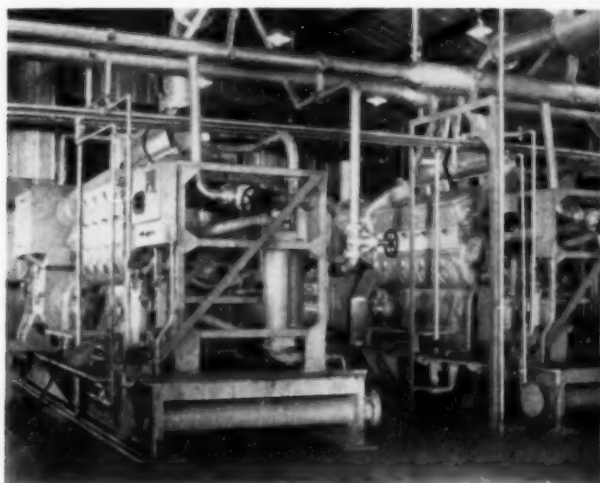
The movable nature of the drilling floor substructure required that weight on it be kept to a minimum. To accomplish this Kerr-McGee chose electric power for the rig. With electric power being used, driving engines are mounted away from the wellhead. When the rig is moved the only connections that need be broken are the line from pumps to standpipe and the mud flow line. Each of the rig's three 875-hp General Motors Electro-Motive 8-567-C diesel engines drives two 500 kw dc generators, which produce a total output of electricity sufficient for a town of 6,000 persons. When the electric power gets to the working end, it must be transformed back into mechanical energy—for this job there are eight separate 625-horsepower motors, each performing its own assigned task. Each of the two Emsco D-1000 pumps on the tender is powered by two motors; another pair of motors drives the 1600 horsepower EDA double-drum drawworks. The Emsco Type PJ 27½-inch rotary table and the Emsco B-14, used for mud-mixing services, are each powered by one of the 625-horsepower motors.



Power for devices of the Rig 46 design is supplied by three 875-hp General Motors Electro-Motive 8-567-C diesel electric units. Shown here, an EMD representative checks newly installed equipment. ➡

Kermac Rig 46 drilling in 55 feet in the East Cameron area offshore Louisiana. ➡

Two of the three General Motors Electro-Motive 8-567-C diesel electric power units onboard Kermac Rig 46. ➡



ARCTIC TANKER USNS ALATNA

THE two 16-cylinder 251 engines supplied by Alco Products, Inc. for the military Sea Transportation Service's Arctic tanker the USNS *Alatna* develop 2000-hp at 950 rpm. Each drives a 1400-kw generator delivering current to two electric motors that provide 1700 shaft horsepower at 105/145 rpm to each of two screws. Electrical equipment in the propulsion system was supplied by the General Electric Company. The engines have 9-inch bore and 10½-inch stroke, and weigh 42,000 lbs each when dry. The marine base supplied

regardless of deflection of the ship's foundation. It eliminates flexible couplings between the engine and the generator, trims installation costs by eliminating the need for separate alignment of the generator, and reduces construction and material costs by doing away with foundation mounting for the generator.

The *Alatna* engines were built with four-point mounting that makes them independent of up and down flexing of ship structure. This laboratory

and application-proven mounting system is practical with Alco engines because the engines are designed to withstand their own internal moment. The four points of mounting are located at the nodes of the deflection curve, thereby subjecting hold-down bolts to a minimum of stress.

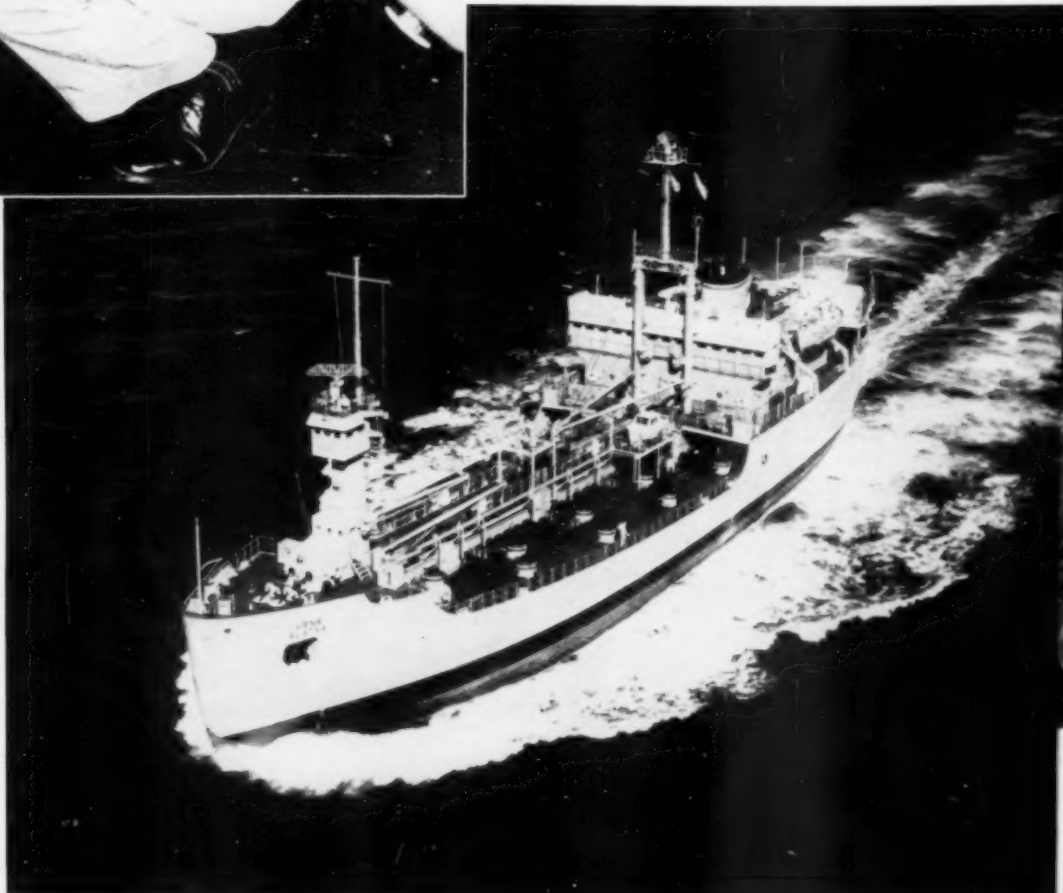
The model 251 engine is the latest designed and built by Alco. The engine is built in three sizes, the 6-cylinder, 900-hp in-line model and the 1800-hp 12-cylinder and 2400-hp 16-cylinder Vee-type engines. Alco—no newcomer to the marine propulsion field—has supplied diesel engines for many types of vessels. Included among more recent installations is the Curtis Bay Towing Company's tugboat *Kings Point*, which ranks as one of the most powerful harbor tugboats in the United States; diesel engines for the *Alatna* and *Chatahoochee*, and engines for three ice-strengthened Arctic cargo vessels now under construction. The basic model 251 engine is readily adapted to varied applications through use of a wide range of standard modifications. None of these require alteration of the basic design; they are all additions to the engine. The power output of all model 251 engines is bolstered by an Alco water-cooled turbosupercharger designed and built as an integral part of the engine.

Ni-Resist (nickel alloy) inserts protect the top ring groove of the engine's pistons, which have replaceable ring carriers. Piston rings are heat-treated for action with the chrome-plated cylinder liners featured in this engine. The base and block of the 251 engine are light-weight, strong weldments providing absolute rigidity, and regular maintenance points are easily reached. The water-cooled turbosupercharger has only one moving part, and these units, together with the lube-oil and jacket-water pumps, are self-aligning for easy installation.



A portion of the engine room aboard the USNS *Alatna*, showing Chief Engineer P. H. Monahan checking a fuel pump on one of the two Alco 16-cylinder model 251 diesel engines. (Official photograph, U. S. Navy.)

with the engines has a deep sump providing positive lubrication under 15-degree list and inclination conditions. The engines have bronze engine-driven salt-water pumps to circulate sea water and shell-and-tube jacket-water coolers, interchangeable bronze jacket-water pumps, and opposite rotation for the twin-screw application. The *Alatna*'s engines are the first Alco marine engines with overhung generators—an assembly process in which the generator is bolted directly to the engine and has no independent support. Alco engineers credit this assembly feature with several advantages. The method permits alignment built in at the factory that remains correct,



VISCOUS ROTARY DAMPERS

Solutions to Problems of (1) Servo Loop Stabilization (Closed), (2) Rotational Transient Stabilization, (3) Torsional Vibration Damping, (4) Tool Chatter Elimination, (5) Reduce Drive and Crankshaft Stress.

ONE of the most significant features of the increasing complexity of mechanical system design in recent years has been a greater awareness and understanding of the problem of vibration control and energy absorption. The importance of control of damaging vibrations and other transients is more widely recognized throughout all phases of industry, and engineers are finding broadening opportunities to achieve more compact design, reduced costs and improved performance through the application of efficient damping devices.

The Houdaille viscous torsional vibration damper is a development of importance to the manufacturers and users of diesel engines. It is currently standard equipment on many diesels—ranging in size and power from the automobile engine to truck, bus, locomotive and marine diesels. The design is simple. There are only two parts, the inertia mass and the housing. The inertia mass in the form of a metal ring is carried in a housing which resembles a small flywheel with a hollow rim. Clearance between the inertia mass and the housing is relatively small. It is filled with a viscous fluid, known as silicone, which has a nearly flat viscosity curve. Since the unit is sealed, no leakage can occur and the damper remains stable in service regardless of its severity.

This device is a true damper and not a detuner. The housing is attached rigidly to the engine crankshaft while the inner, free-running damper mass, in reality a flywheel, is separated from it by a thin film of the silicone fluid. Because of the high viscosity of this fluid, the damper mass rotates at engine speed. When the plus and minus changes in velocity, which are vibrations, are transmitted from the crankshaft to the housing, the damper mass or flywheel, because of its inertia, tends to continue to rotate at constant speed. Thus, the vibrations are damped by the drag of the viscous fluid separating the two parts and its resistance to the shearing action.

From an engineering standpoint, the amount of damping is a power function of the diameter of the damper mass. For this reason, the reduction in amplitude which is possible with this style damper depends upon the work input of the order

having the largest amplitude in the working range; the allowable physical dimensions of the damper; the permissible damper weight and the inherent damping of the engine. Since the damper is untuned, if it is constructed to satisfactorily reduce the order of largest amplitude, all other orders in the operating range will be correspondingly reduced. Over a wide range of speed where many orders are involved, this is particularly advantageous. Obviously, it does not require tuning to any given engine.

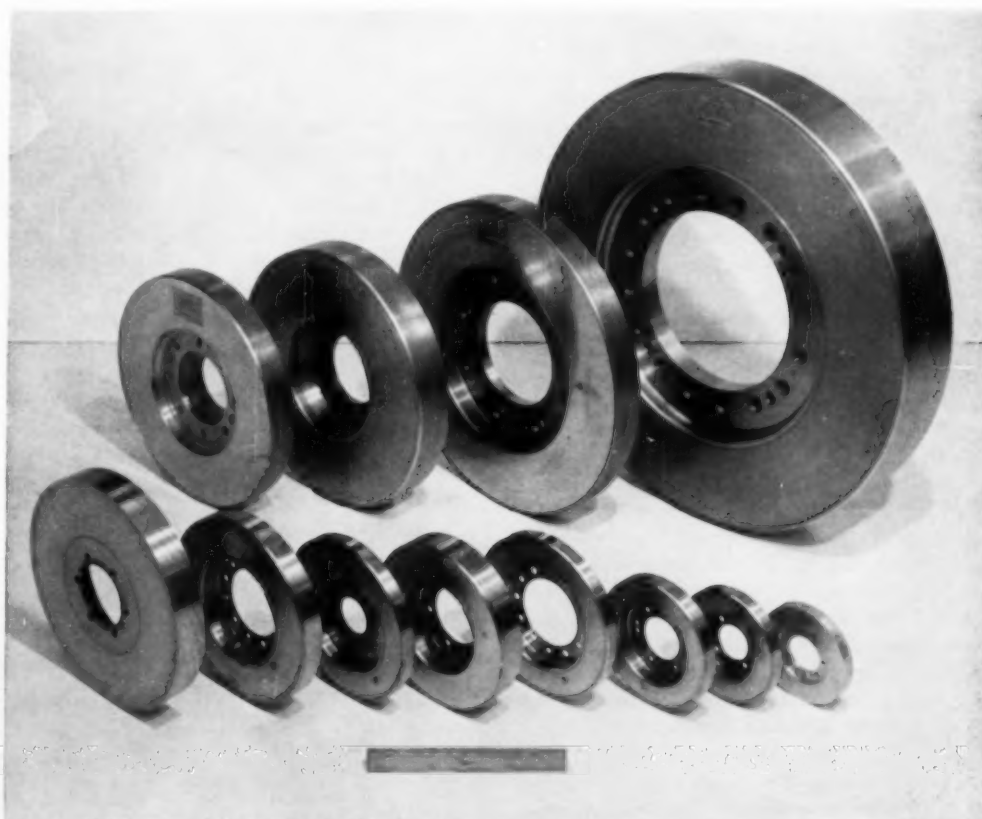
Houdaille viscous torsional vibration dampers are manufactured to meet the individual requirements

of specified engine design. The degree of effectiveness depends upon employing a unit of the proper size for the engine. While too small a unit will tend to reduce torsionals, it will not be as satisfactory as one of the proper size. Since so many engines have approximately the same torsional characteristics, it is possible to employ identical dampers to a number of different engines with uniformly satisfactory results. Practical applications are not confined to crankshafts, alone. Problems of vibration in other shafts, which, by virtue of size, shape and service generate torsionals, may be solved by the use of these dampers to minimize the criticals.

RANGE OF DAMPER SPECIFICATIONS:

O.D. Inches	THICKNESS Inches	FLYWHEEL INERTIA Lb. In. Sec. ²	HOUSING INERTIA Lb. In. Sec. ²	DAMPING CONSTANT In. Lb./Rad./Sec.
1.625	0.750	.00023	.00003	.002
34.031	5.875	330.000	138.000	58,000

These UNTUNED DAMPERS obtain a high relative efficiency even though the damping varies considerably from calculated optimum. The curves indicate a damping efficiency of approximately 80% even though damping is 50% or 200% of optimum.



The work input to a vibration is directly proportional to the amplitude. Work dissipated by a Viscous Damper is proportional to the square of the amplitude. The power absorbed by a Viscous Damper is equal to:

$$P = \frac{I \omega^3 \beta^2}{86.7 \times 10^6}$$

WHERE: P = Horse Power

I = The moment of inertia of the Damper Fly Wheel in inch lb. sec.²

(Omega) ω = Frequency of vibration in radians per second.

(Beta) β = Single amplitude of vibration in degrees

M/V I. F. FREIBERGER

ASIXTH diesel towboat has officially entered the Ohio River coal trade for the Island Creek Fuel & Transportation Company, Huntington, W. Va. The twin-screw 148-ft vessel built by Dravo Corporation, Pittsburgh, was christened the *I. F. Freiburger* in honor of the chairman of the board of the Island Creek Company. Mr. Freiburger's wife, Mrs. Fannie F. Freiburger, of Cleveland, Ohio, broke the traditional bottle of champagne on the towboat's capstan in ceremonies at the Allegheny River wharf in Pittsburgh on August 28. Mrs. Freiburger's aide was her daughter, Mrs. Ruth Freiburger Mielziner, of Shaker Heights, Ohio.

The new vessel is a sistership to the *Raymond E. Salvati*, which Dravo delivered to Island Creek last summer. With the addition of the *I. F. Freiburger*, the Island Creek fleet now represents a combined 9116 hp. Like the *Salvati*, the new towboat is powered by two Enterprise engines with a combined 2560 shaft hp. Hull, rudder and propeller design features developed by Dravo in model basin tests over the past several years give the boat greater barge-pushing ability than other towboats of a similar size and horsepower. The *Freiburger* can tow 20 bargeloads of coal upstream against the Ohio River current. Her twin four-bladed propellers are stainless steel and rotate inside Dravo Kort nozzles, which increase thrust by directing the flow of water to and away from the propellers. The six rudders, one behind and two ahead of each propeller, are hydraulically operated from the pilothouse. Of all-welded steel construction, the boat includes such modern features as radar, ship-to-shore telephone, reverse reduction gears and metal-paneled interior walls. Nine staterooms house officers and crew. The Island Creek fleet now includes the *Freiburger*, the *Salvati*, the *James D. Francis*, built by Dravo in 1951, *Island Creek*, *Porpoise*, and *Black Onyx*. The towboat, *I. F. Freiburger*, was launched at Dravo's Neville Island shipyard, near Pittsburgh, on July 16, 1957. Her dimensions are: Length overall (molded) 148 ft; Waterline length at 8-ft draft 144 ft 3 in.; Beam (molded) 34 ft; Beam (extreme) 34 ft 7 in.; Depth at side (molded to main deck) 10 ft 6 in.; Sheer Forward 2 ft; Camber of superstructure deck 5 in. in 34 ft. Hull, rudder and propeller designs are based on Dravo's research program, over the past several years. The *I. F. Freiburger* is designed to tow 20 standard 900-ton coal barges or 15 barges of 1500-ton capacity upstream against the Ohio River current. She is powered by twin Enterprise marine diesel engines, equipped with reverse-reduction gears. Each engine delivers 1280 continuous horsepower at a propeller speed of 185 rpm. Engines and reverse-reduction gears are mounted amidships on the hull on an integral base. Fuel tanks are located forward and aft, and to either side of the machinery space. The superstructure includes the main deckhouse, upper deckhouse and pilothouse. In the main deckhouse are quarters, lounge and toilet facilities for an eight-man crew, an all-electric galley, a mess room seating ten, machinery space, steering gear compartment and deck stores space. Quarters, lounge and toilet facilities for eight

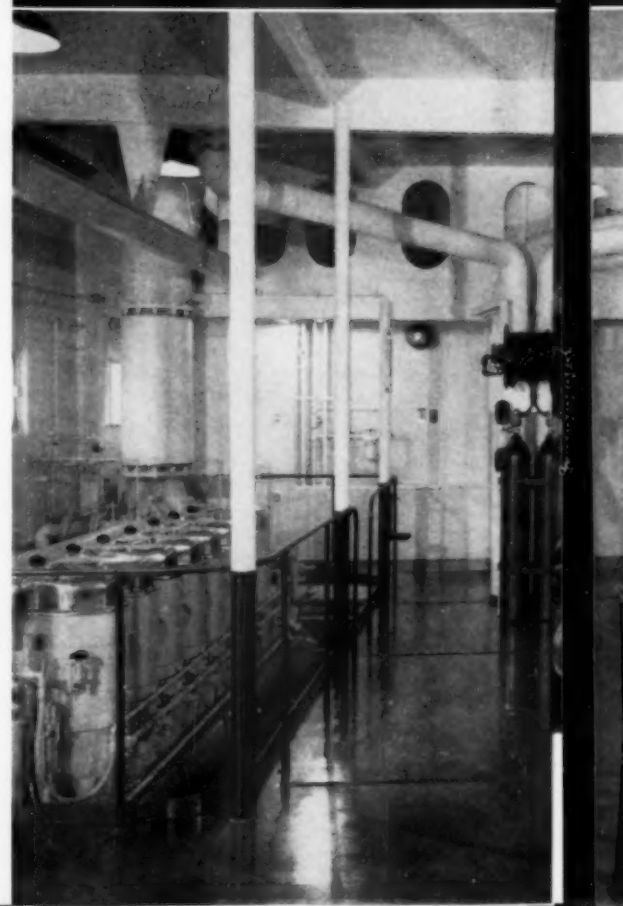
officers and guests are contained in the upper deckhouse. The pilothouse, located atop the forward end of the upper deckhouse, houses controls for complete towboat operation, with the exception of engine starting. Electric power for 440-volt, three-phase, 60-cycle alternating current is supplied by two diesel generators of 75 kva 60 kw capacity. Fenders and the four towing knees are of all-steel, welded construction. The towing knees are built into the forward end of the hull, forming a part of the headlog.

Hull fittings include two five-foot keels, a 10-in. towing bitt fitted forward, eight four-foot keels, ten single-roller button chocks with 15-in. diameter rollers and two electrically-powered double barrel capstans. The *Freiburger* has two steering gear systems, one for flanking and one for steering ahead. Steering engines are located above deck level for easier access. Each system consists of a hydraulic ram with opposed cylinders, steering control valve and follow-up mechanism. Both rams are connected to a common hydraulic accumulator and pump. A second pump cuts on automatically when pressure falls to approximately 75 psi below operating level. Steering is controlled from the pilothouse console by means of push rods running to the steering compartment. Through the follow-up system, the rudders remain at the same angle as the levers in the pilothouse, giving the pilot a constant indication of rudder positions. Six streamlined balanced rudders control the vessel's course. One is located aft of each propeller for steering ahead and two forward of each propeller for flanking. The four-bladed propellers are 8 ft, 6 in. in diameter, and made of high tensile, stainless steel. Their pitch, area and blade form have been designed by Dravo for use with the Dravo Kort nozzle.

Pumps include a filter feed pump, a turbine type potable water pump, a turbine type wash water pump, two 70 gpm hydraulic steering gear pumps, a fuel oil transfer pump, a self-priming 2½-in. suction fire and bilge pump, a fuel oil trimming pump, a hand rotary pump for initial filling of the day tank and two lube oil hand rotary pumps for priming the main engines. Each compartment can be emptied by the fire and bilge pump through a bilge manifold located in the forward engine room. An auxiliary bilge suction system in the engine room operates from the cooling system raw water pump on one engine. Check plugs in the bilge manifold prevent bilge water from flowing when pumping through the fire main. The fire pump gets its suction from the main injection header. Taking their suction from the injection pipe, the engine-driven raw water pumps discharge to the jacket water cooler. Most of the discharge is carried overboard from the heat exchanger, except for some raw water which is by-passed to the gear lube oil cooler and then to the stern tube to lubricate the strut bearing. The *I. F. Freiburger* is equipped with the most modern navigation

Spacious engine room of the towboat *I. F. Freiburger* contains twin Enterprise Marine diesel engines, equipped with reverse-reduction gears.

DIESEL PROGRESS





equipment, including radar, ship-to-shore radio, a teletalk system, an airhorn and a 16-in. steamboat bell with electrically-operated clapper. Two 19-in., 45 ampere electrically operated carbon arc searchlights are mounted on the Texas deck forward and outboard of the pilothouse. Two 1000-watt incandescent floodlights are provided on the after end, one port and one starboard.

In addition to the combination fire and bilge pump, fire-fighting equipment includes: two 50-pound CO₂ cylinders and locally controlled hose reels with 50 ft of hose in the engine room; one 35-pound CO₂ bottle for the deck stores compartment; three 15-pound CO₂ portable hand type extinguishers; two 5-pound CO₂ extinguishers; six small foam type extinguishers, and four standard fireman's axes. An oil-fired boiler generates steam for hot air heaters.

Principal Equipment

Main Engines	Model DMG-38 Enterprise
Air Compressors	Gardner-Denver Company
Lube Oil Filters	Honan-Grane
Lube Oil Strainers	Cuno
Shell & Tube Jacket	
Water Coolers &	
Lube Oil Coolers	Thermochanger
Intake Air Filters	Air-Maze
Generator Units	General Motors, Detroit
Water Filters	Cuno
Switchboard	Lake Shore Electric Corp.

Taking part in ceremonies marking the christening of the diesel towboat *I. F. Freiburger* were (left to right) Mr. Freiburger, for whom the vessel is named, chairman of the Board of Island Creek Fuel and Transportation Company; his wife and sponsor of the vessel, Mrs. Fannie F. Freiburger, of Cleveland, Ohio; their daughter, Mrs. Ruth Freiburger Mielziner, of Shaker Heights, Ohio, who served as sponsor's aide; and W. K. Fitch, chairman of the board of Dravo Corp.

37



A NEW PETTERS RATED AT 3,000 RPM

By REX W. WADMAN

NEW York, Nov. 12. Today at a very delightful luncheon at the Waldorf Astoria, through the courtesy of Brush Aboe, Inc., I saw a 3 in. x 3 in. single cylinder air-cooled diesel engine deliberately and with malice aforethought rated at 3,000 rpm.

In the introductory speech made by Managing Director, D. K. Fraser of Petters Limited of Staines, England, he showed no evidence in either his words or delivery of them to indicate that the new little air-cooled Petters wasn't more than capable of operating consistently and more or less indefinitely at 3,000 rpm. In fact, Mr. Fraser indicated that soon, maybe within the year, they will be able to rate this engine at a higher speed which makes it, in my book, stand out as one of the most interesting small engines I have seen in a long time.

As so many of you know, Brush Aboe, Inc. manufactures a number of makes of diesel engines in England (refer to pages 264 and 265, Volume 22, DIESEL ENGINE CATALOG). One of the companies that they have operated very successfully is that of Petters Limited in Staines. This is one of the largest producers of fairly low-rated engines in the world. I believe that the figure for this year of 1957 will show that the Staines plant will have shipped about 56,000 engines and to my knowledge the only other diesel engine plant in Europe to come anywhere near them is the Deutz

group who may, in this year of 1957 exceed that total. Any way you look at it, Petters turn out a lot of engines. They go all over the world. Many of them have been sold in these United States and I think a lot of these little engines I saw here today will become American citizens in the not too distant future.

On this page we are showing you the single cylinder, the two cylinder and the three cylinder units of the new Petters PC Series which also, of course, includes the four cylinder engine which is not illustrated. They range in weight from 243 pounds

D. K. Fraser, Managing Director, Petters Limited of Staines, England, who made the key speech at this Waldorf luncheon today.

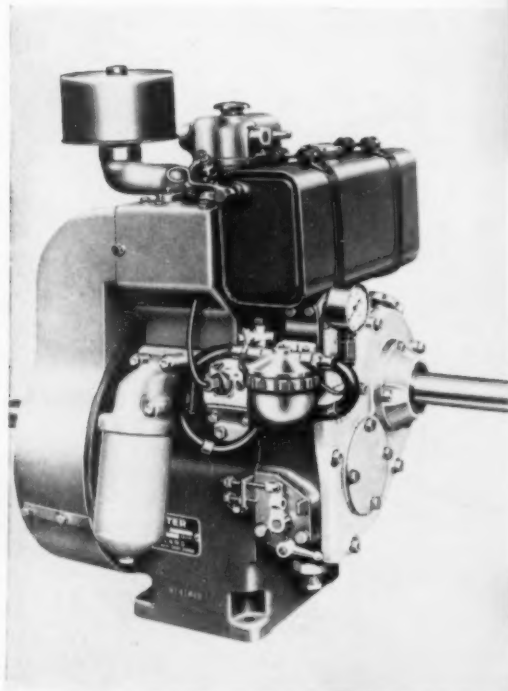


to 503 pounds and provide from 6.25 to 25 hp. As stated above, all four units are rated at 3,000 rpm.

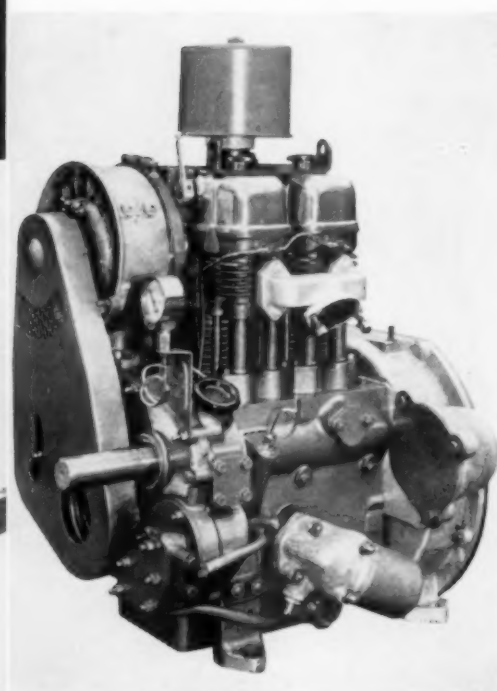
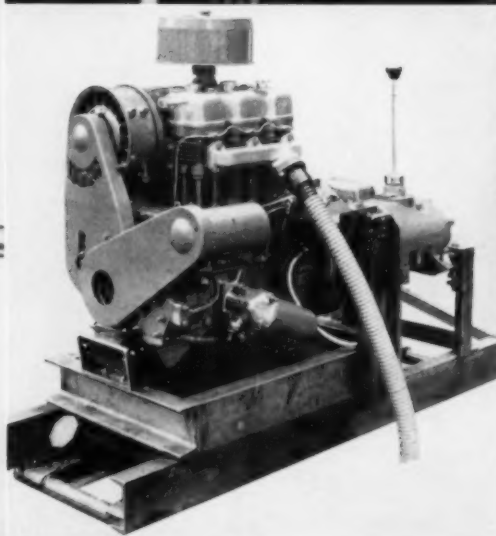
My enthusiasm for this new Petters unit stems from its ability to install in practically the same over-all dimensions as existing gasoline engines. On the weight side, of course, it is still a little heavy, comparatively speaking, but dimensionally, it's within practical limits for most industrial O.E.M. equipment now gasoline engine driven.

Mr. Fraser stated in no uncertain terms that the new PC Series of air-cooled diesels was competitively priced for the American market and offered special benefits when operations called for running steadily in tropic heat or Arctic cold, and he also stated that the low power-to-weight ratios of this new series has made it possible to adapt it as a power source for rotary cultivators, small alternating generators, portable cement mixers, portable centrifugal pumps, fork lift trucks, dumpers, airport ground servicing equipment, not to mention many other industrial and agricultural applications which may well include mechanical refrigeration for railroad reefers, air compressor drives for 101 uses including ventilating and normal refrigerating units. Then, of course the use of this new series in the marine line is obvious because of its compactness and light weight. It will be seen and exhibited at the Motor Boat Show in New York, January 20th to 24th.

Single cylinder PC-1 Petters air-cooled diesel rated at 6.25 hp at 3,000 rpm.



In the center column is the three cylinder PC-3 Petters air-cooled diesel which develops 18.75 hp and below is the two cylinder PC-2 developing 12.5 hp at 3,000 rpm.



IPSWICH, MASS.

USE of two economy fuels in six of seven Fairbanks-Morse diesels has enabled the Ipswich, Massachusetts, municipal power plant to generate a kilowatt-hour at a fuel cost more than 40 percent below the cost with No. 2 diesel oil. Through 1953, the plant used No. 2 diesel fuel exclusively. In 1954 a dual fuel engine began to utilize the newly available supply of natural gas. Subsequently, a decision was made to supplement these fuels with processed crankcase drainage and the plant began to use this heavy oil in 1956. The result is a combination of the use of all three classes of fuel with remarkably satisfactory results. Four of the engines burn heavy fuel and use No. 2 for starting. The fifth unit burns either heavy fuel or gas with No. 2 used as pilot oil. The sixth engine burns gas and No. 2 as pilot oil. Now only the oldest engine in the plant is restricted to use of No. 2 fuel and this unit is retained as a standby. The newest engine, a 1920 hp model 38D8½, Fairbanks-Morse opposed-piston diesel, employs high temperature cooling, a feature of considerable importance in the use of heavy fuels. With a small modification of the system for burning crankcase drainage, all the engines now using heavy fuel could burn commercially available residuals. Transition to the use of economy fuels has been made without difficulty, with no interruption of power and with no apparent increase in the cost of maintenance.

Rising fuel prices were the factor that persuaded Ipswich to switch to economy fuels. The current

price of No. 2 is 12.33¢ per gallon. Crankcase drainage is purchased at 5.23¢ per gallon as delivered. Processed and ready to burn, it costs 7.1¢ per gallon. The difference between the price of raw fuel and the cost after processing is chiefly due to gallonage reduction as the result of removing bottom settlings and water. For an equal power output, the fuel cost is about the same when burning natural gas or crankcase drainage. By referring to Table I, we find that in 1953 Ipswich burned 1,059,379 gal. of No. 2 fuel to generate 13,319,500 kw hr. At that time, the fuel price was 10.2¢ per gal. During that year the cost of fuel per kw hr generated was 8.1 mills. Gas was introduced as fuel in 1954. That year power generated was 13,986,100 kw hr and 4,184 mcf was consumed at a cost of \$2,092.00 and 1,063,829 gal. of No. 2 fuel at a cost of \$98,342.00. The combined fuel cost was \$104,434.00. This reduced the fuel cost per kw hr to 7.46 mills.

In 1955, a total of 15,721,200 kw hr was generated, the consumption of gas was increased to 68,695 mcf, the consumption of No. 2 fuel was 1,063,829 gal. and the total fuel bill was \$100,434.00. Increased use of gas brought average fuel cost down to 6.38 mills per kw hr. By 1956, the price of No. 2 fuel had inched up to 12.33¢ per gal. and in an effort to hold costs down, the plant used about 200,000 gal. of treated crankcase drainage at a cost of 7.1¢ per gallon. The liquid fuel, both No. 2 and crankcase drainage, totaled 708,534 gal. at a cost of \$76,924.00. At 12.33¢ per gal., it would

have cost \$87,337.58 or \$10,413.58 more for the year. Gas consumption was stepped up to 93,391 mcf and the total fuel cost was \$123,619.00 to generate 17,272,400 kw hr. During this transition period the price of No. 2 fuel advanced 21%. Had the plant used nothing but No. 2 fuel at 12.33¢ per gal., the fuel bill for the 1956 output of 17,272,400 kw hr would have been \$169,286.79. The apparent saving through burning economy fuels in 1956 was therefore \$45,667.79.

The plant's success with crankcase drainage fuel in 1956 has led to increased use of this oil in 1957. Ralph H. Wetmore, Chief Engineer, reports that through doubled use of crankcase drainage the liquid fuel cost for the first half of the year has been reduced \$12,000. and he expects this figure to be doubled by the end of the year. This saving on liquid fuel cost reflects not only the increased use of crankcase drainage for the oil burning engines but for dual fuel pilot oil as well. Gas requires no attention and is preferred to heavy fuel, but gas is not constantly available. During cold winter months, home heating has prior claim to available gas and the municipal power plant must switch to liquid fuel on short notice. For that reason, another form of economy fuel had to be found in order to avoid an increase in electric rates. This has been done with outstanding success despite the fact that the Fairbanks-Morse diesels at Ipswich vary in age, type and power per unit. This variation reflects plant growth over a 30 year period

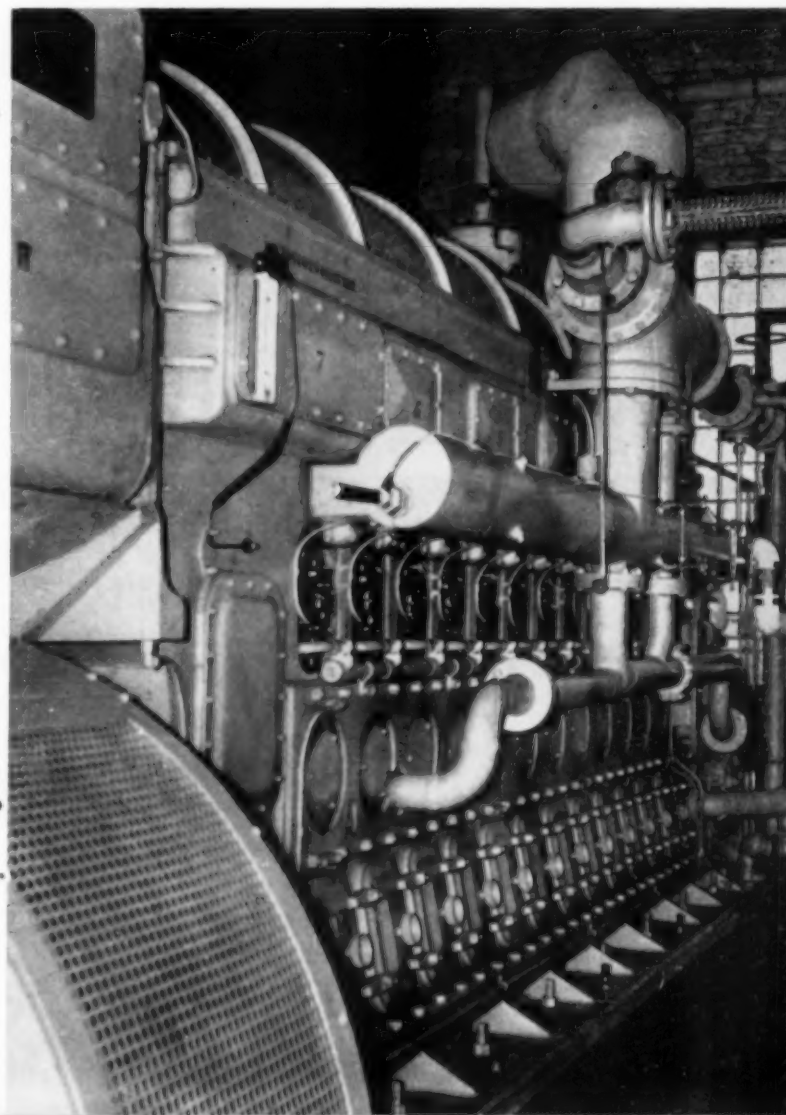
In 1954 this 12-cylinder, 1920 hp Fairbanks-Morse dual fuel engine was installed as the first move to reduce operating costs by burning economy fuel.

TABLE III

	Engines Installed		Total Plant Capacity in Kilowatts	Peak KW Demand on Plant	Kilowatt Hours Generated
	Horsepower	Kilowatts			
1927	240	164			
	360	246	744	390	1075210
1928			744	390	1185404
1929			744	510	1405323
1930	750	513	1078	500	1613149
1931			1078	540	1869742
1932			1078	530	1818902
1933			1078	560	1977284
1934	500	340			
	350	221	1078	610	2188905
1935			1078	660	2403178
1936			1078	860	3114585
1937	875	600	1678	900	3459731
1938			1678	940	3542127
1939			1678	980	3679700
1940			1678	1220	3978988
1941	1050	731	2190	1325	4618700
1942			2190	1350	5516549
1943			2190	1350	7070400
1944			2190	1635	7979105
1945			2190	1585	6783664
1946			2190	1690	7054900
1947			2190	1800	7952800
1948	1600	1136	3326	2180	8531400
1949			3326	2410	899600
1950			3326	2700	10139435
1951	1600	1136	4446	2750	11431130
1952			4115	2950	11738832
1953			4115	3125	13319500
1954	1920	1360	5475	3350	13986100
1955			5475	3480	15721200
1956			5475	3840	17272400
1957		1360 *	6835	4100	19000000 *

* Projected.

* Equals engine capacity, not generator rating.

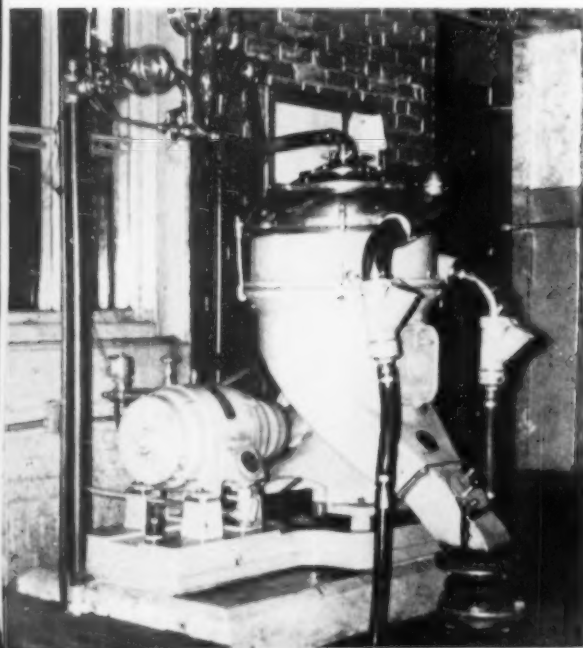


during which time 11 Fairbanks-Morse engines were installed. The 7-engine plant as it stands today is described in Table II.

Up until 1927, the Ipswich Municipal Power Plant was steam operated. During that year, two F-M Type Y engines were installed, a 4-cylinder unit rated 240 hp and a 6-cylinder unit of 360 hp. The first expansion as a diesel plant occurred in 1930 when a 750-hp 5-cylinder 16 x 20 in. model 33 F-M diesel was put in and steam entirely eliminated. This engine is still operating with the original cylinders and pistons. In 1934, Ipswich added two more F-M diesels, a 5-cylinder, 12 x 15 in. model 33 rated 500 hp at 400 rpm and a 14 x 17 in., 5-cylinder, model 32 rated 350 hp at 257 rpm. At this time, the 6-cylinder Type Y engine installed in 1927 was taken out. As the result of population growth and greater power demand, the town decided to install another F-M engine in 1937, this time a 5-cylinder, 16 x 20 in. model 33 rated 875 hp at 300 rpm. After 20 years of hard work, this engine is still giving excellent service. Then in 1941, another model 33 was added, a 6-cylinder, 1050 hp F-M diesel operating at 300 rpm. The other Type Y installed in 1927 was then taken out.

It was not until after World War II and engines again became available for civilian use that more power was added. Ipswich bought in 1948 a 1600 hp model 38D8½ 10-cylinder opposed-piston Fairbanks-Morse diesel operating at 720 rpm driving a 1120 kva., 4160 volt, 60-cycle F-M generator. All alternators subsequently added were of 4160 volts and 60 cycles. Three years later, in 1951, a similar unit was added. The rapid increase in power demand made necessary further plant expansion in 1954, at which time Ipswich decided to start using natural gas as economy fuel. Accordingly, a 12-cylinder, model 38D8½ dual fuel 720 rpm Fairbanks-Morse opposed-piston engine and 1700 kva. alternator were installed. The newest engine, installed in 1957, was another 12-cylinder, 1920 hp model 38D8½, 720 rpm engine with an oversize

One of the most important elements in the system of burning heavy fuel is the centrifuge. This one is a Titan self-cleaning unit, automatically operated by electric cycling switches which admit raw fuel, then stop it a few seconds while the machine purges itself before water is flushed out the sludge.



generator rated 2250 kva. This was the first high temperature cooled engine in the plant and is also the first one initially equipped to burn heavy fuel. Meanwhile, successful use of gas as fuel had resulted in conversion to dual fuel operation of the 1600 hp engine installed in 1951.

The 10-cylinder model 38D8½, 1600 hp installed in 1948 was equipped to burn heavy fuel in 1956 and so were the 857 and 1050 hp model 33 engines installed in 1937 and 1941 respectively, thus placing the entire plant on economy fuel except for the 750 hp unit installed in 1930. Fuel processing capacity for the whole plant was installed at one time. Annual output and peak demand increases over the years (Table III) reflect the need of expansion. In 1927 it started with a peak demand of 390 kw and an annual output of 1,075,210 kw. Ten years later it had increased to a 900 kw peak and 3,459,731 annual output. With the passing of another decade the peak demand became 1800 kw and the yearly output was 7,952,800. Five years later in 1952 it had moved up to a peak demand of 2950 and 11,738,832. By 1954 it reached 3350 and 13,986,100 respectively and in 1956 it mounted to 3840 and 17,272,400. The projected 1957 annual output is 19,000,000 kw or more because the town is still expanding rapidly. It is worthy of mention that the recent large power increases at Ipswich have been made within the original structure, thus eliminating the cost of adding to the building. A factor of great importance is the installation of Fairbanks-Morse opposed-piston engines of compact design and higher rotative speed with corresponding smaller overall dimensions in relation to power rating.

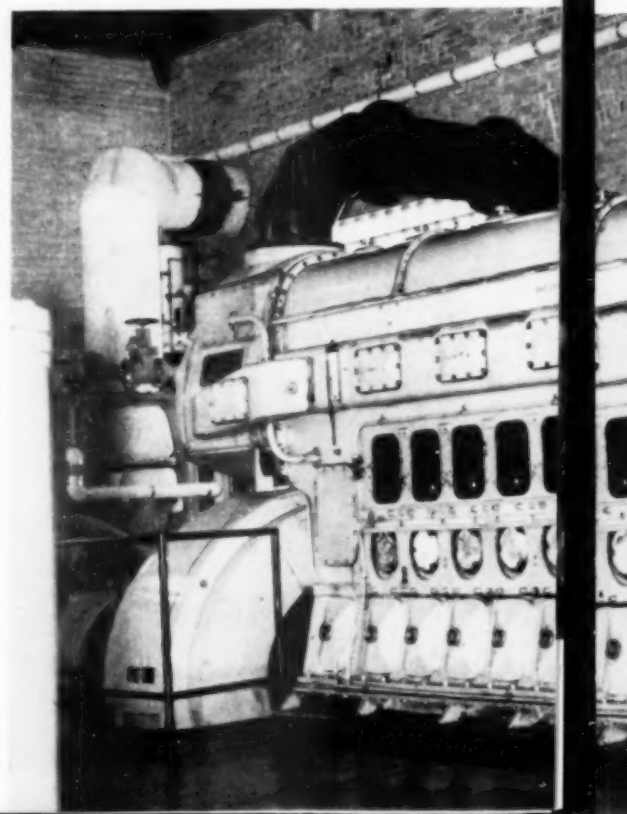
As the result of progressive engineering improvement, by taking advantage of higher thermal efficiency of later engine models, and now by using low cost fuels, Ipswich has had no increase in electric rates during the past quarter of a century. It is conservatively estimated that the people of the town save \$35,000 per year on electric bills alone. For street lighting and municipal electric requirements, Ipswich pays \$15,400 less to the Municipal Power Plant than it would cost to buy an equal amount of electricity at the rate paid by nearby municipalities. In addition, the plant pays \$15,000 per year into the town treasury out of operating profits. The savings total \$65,400 per year. This has been achieved despite the prevalent rise in costs. Prices of No. 2 diesel fuel have increased over 50 percent during the past few years. Salaries have been increased and all other items of expense have gone up, not the least important of these being the prices of wire, transformers, poles and all the miscellany associated with expansion and improvement of the distribution system paid for through economy in the generation of power. Chief Engineer Wetmore and Norris Stilphen, Executive Secretary of Ipswich, agree that this has been possible not alone by the use of economy fuels but by progressive reduction in the rate of fuel consumption.

So far as Mr. Wetmore has been able to determine, maintenance costs have not increased as the result of changing fuels. There is nothing regarding operation that is materially different now that crankcase drainage is being used except the fuel cleaning and heating process. The crankcase drain-

age has been used as pilot oil and has worked very well. It is not inclined to form agglomerates and resludge in storage and the viscosity is low enough to start the engines on it. However, moves in the direction of its use as pilot oil and possibly dispensing with the use of No. 2 fuel have been made slowly and cautiously. The method of processing the crankcase drainage is somewhat simpler and the installation for doing it is less expensive than is required for burning heavier residual fuel. As received from the supplier, it contains considerable amounts of sediment and moisture. This is reduced by bottom draining the 128,000-gallon main storage tank into a settling tank from which the heavy

TABLE I

	1932	1934	1940	1954
Total Kw. Hrs. Gen.	23,310,500	12,966,100	15,721,200	17,272,400
Gal. Fuel Oil	1,099,779	1,003,629	741,811	708,324
Cost Fuel Oil	\$ 128,141	\$ 96,342	\$ 80,219	\$ 76,944
MEP Gas		4,184	68,699	93,791
Cost Gas		\$ 2,092	\$ 34,347	\$ 46,699
Total Fuel Cost Oil and Gas	\$ 128,141	\$ 100,434	\$ 114,566	\$ 123,643

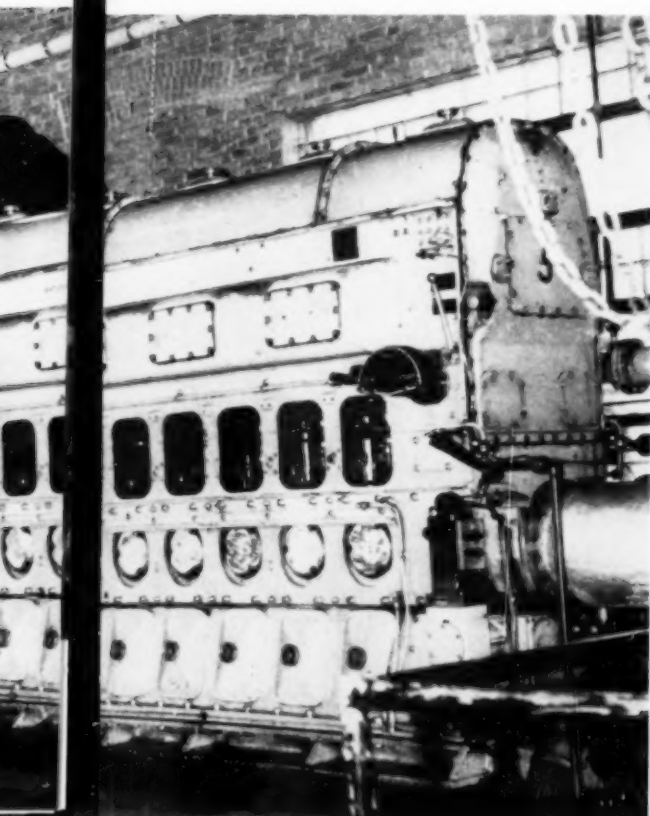




▲ This view of the Ipswich plant shows Maxim exhaust silencers, Air-Maze air filters, fuel storage tanks and the pond which supplies raw water for cooling.

sludge is drawn and the rest pumped back into the main tank. Fuel is taken from a high suction, put through a heater and then into a self-cleaning centrifuge which is operated by a series of three electric cycling switches. A petroleum solvent is added before centrifuging. Fuel is centrifuged at 160° F. A by-pass through the heater enables the fuel to be circulated at the start to establish correct temperature for centrifuging.

→ The first opposed-piston Fairbanks-Morse diesel installed at Ipswich. It was put in in 1948. It is a 10-cylinder, model 38D8¹/₈, 1600 hp, initially equipped for use of No. 2 fuel and subsequently connected to the economy fuel system. While economy fuel was not introduced until 1954, this engine brought higher thermal efficiency and reduced operating costs.



Once set in operation, the first cycling switch opens a solenoid valve and permits fuel to flow into the centrifuge for 15 minutes plus or minus five minutes. Then the second automatic timer shuts off the oil for a few seconds while the centrifuge clears itself. The third timer then opens a water valve to flush the solids out of the centrifuge bowl. The cycle is then repeated. The centrifuged oil drops into a 600-gal. storage tank in which a float and lever arrangement controls the flow of raw oil to the centrifuge. Sludge is dropped into a separate tank from which it is pumped for use as road oil. Gallonage loss by processing is about 5 percent. It has never exceeded 8 percent. The 600-gal. fuel tank has steam coils which automatically maintain a temperature of 130° F. It is only necessary to hold the fuel above wax-forming temperature. A centrifugal pump delivers the fuel at 15 psi. to a steam jacketed float level tank from which the fuel is circulated through a loop to the injectors. The engine takes what it needs from the loop and surplus fuel is circulated back to the float level tank. If at any future time No. 6 fuel is used, necessary additions to this system can be made very easily.

The new opposed-piston engine installed in 1957 is equipped for high-temperature cooling which facilitates use of heavy fuel and is believed to reduce cylinder wear. Jacket temperature is held at 225°f. When this engine is in operation, it also supplies all plant steam requirements for heavy fuel processing and circulation, utilizing an exhaust waste-heat boiler. When the engine is not in operation, steam is provided by an oil-fired boiler which also maintains temperature in the high-temperature cooling system. Ralph Wetmore believes that an idle engine depreciates about as fast as one that runs continuously. With regard to periods of operation between general overhauling, he will not take an engine down unless there is some reason to believe it needs it. Neither the periods of time between overhauling nor the number of hours an engine has been running is looked upon as reason to dismantle and repair an engine. If, on the other hand, it is apparent that an engine needs adjustment or repair, these conditions are corrected immediately. By this procedure he believes the engines are maintained in a better condition than would be true if an attempt were made arbitrarily to round out a fixed period of operation before overhauling. The plant auxiliary equipment is partly new and partly old. When new engines were installed, existing pumps in usable

condition and of the right size were retained, thus holding down the cost of expansion.

With the exception of the high temperature cooled 12-cylinder unit, conventional closed cooling is employed in all engines and the jacket temperature is held at 160° F. A natural pond fed by two brooks back of the engine room supplies raw water. All engines are equipped with air filters. Lubricating oil is cleaned with cellulose type filters. Standardization on one make and type of filter for all the engines simplifies the routine changes of filter elements. In addition to supplying electricity for the town, the plant pumps city water from a nearby reservoir at a rate of one to one and a half million gallons daily. One of the most progressive plant improvements is installation of modern switch gear as a new engine and generator is added.

Further growth of the plant is anticipated due to community growth and increased power demands of Ipswich residents for home appliances, particularly air conditioning. A project to build 500 new homes will demand another substantial block of power. The adjoining village of Rowley buys its power from Ipswich. There is some industrial power demand. Sylvania Electric Corp. has a large factory in town and there are several freezer plants. With increasing use of economy fuels, Ipswich's expanding power plant will meet the need and hold the line against rising costs.

Plant Equipment Ipswich, Mass.

Diesel Engines	Fairbanks, Morse
Generators	Fairbanks, Morse
Pumps	Fairbanks, Morse
Pump motors	Fairbanks, Morse
Silencers	Maxim
Lube oil filters	Honan Crane
Fuel centrifuge	Titan
Air filters	Air-Maze
Pyrometers	Alnor
Switchboard components	Westinghouse
Temperature control jackets	Amot
High temperature control	Sarco
Heat Exchangers	Ross and Schutte & Koerting

TABLE II

Eng. No.	Year Installed	Engine Model	No. Cyl.	Horsepower	RPM	KVA	Volts	Cycle	Fuel Used
1	1930	33	5	750	257	630	2400	60	No. 2
* 2	1954	38DD8-1/8	12	1920	720	1700	4160	60	No. 2 or heavy & gas
3	1941	33	5	1050	300	913	2400	60	No. 2 gas & heavy
4	1937	33	5	875	300	750	2400	60	No. 2 & heavy
f 5	1948	38D8-1/8	10	1600	720	1420	4160	60	No. 2 & heavy
6	1951	38DD8-1/8	10	1600	720	1420	4160	60	No. 2 & heavy
x 7	1957	38D8-1/8	12	1920	720	2250	4160	60	No. 2 & heavy

* Using crankcase drainage as pilot oil experimentally.

f Converted in 1956 to burn heavy fuel.

x Oversize generator maximum output at present 1700 k.v.a.

LACLEDE STORAGE SUCCESS WILL ASSURE ST. LOUIS NATURAL GAS THIS WINTER

**Three 660-Hp Ingersoll-Rand Engine-Compressors
Operate Around The Clock To Pump Gas Underground
For This Winter's Peak Heating Demand.**

IN one of the biggest and most successful projects of its kind, Laclede Gas Company of St. Louis is pumping billions of cubic feet of natural gas down into sandstone that never held gas before so that the company will be able to heat additional thousands of St. Louis homes this Winter. Three big Ingersoll-Rand gas engine-compressors are taking up to 16 million cubic feet of natural gas a day, delivered by pipeline from Louisiana, compressing it to 655 pounds per square inch, and discharging it down 1400 to 1500-foot wells into a natural underground dome to be trapped by rock and water until it is needed during the cold weather next Winter. As this is written, there is more than 4 billion cu ft of gas down in the ground. Laclede's geologists estimate there is room for 50 billion. It takes a special kind of courage to put hundreds of thousands of dollars worth of gas down a well on the assumption that you can get it back when you want it. Underground storage is far from new and a growing number of companies have utilized former gas fields for this purpose, but Laclede was one of the first to trust its wealth to a water-bearing formation that had never held gas before.

The potential for increased service to the public justified the gamble. The company was heating

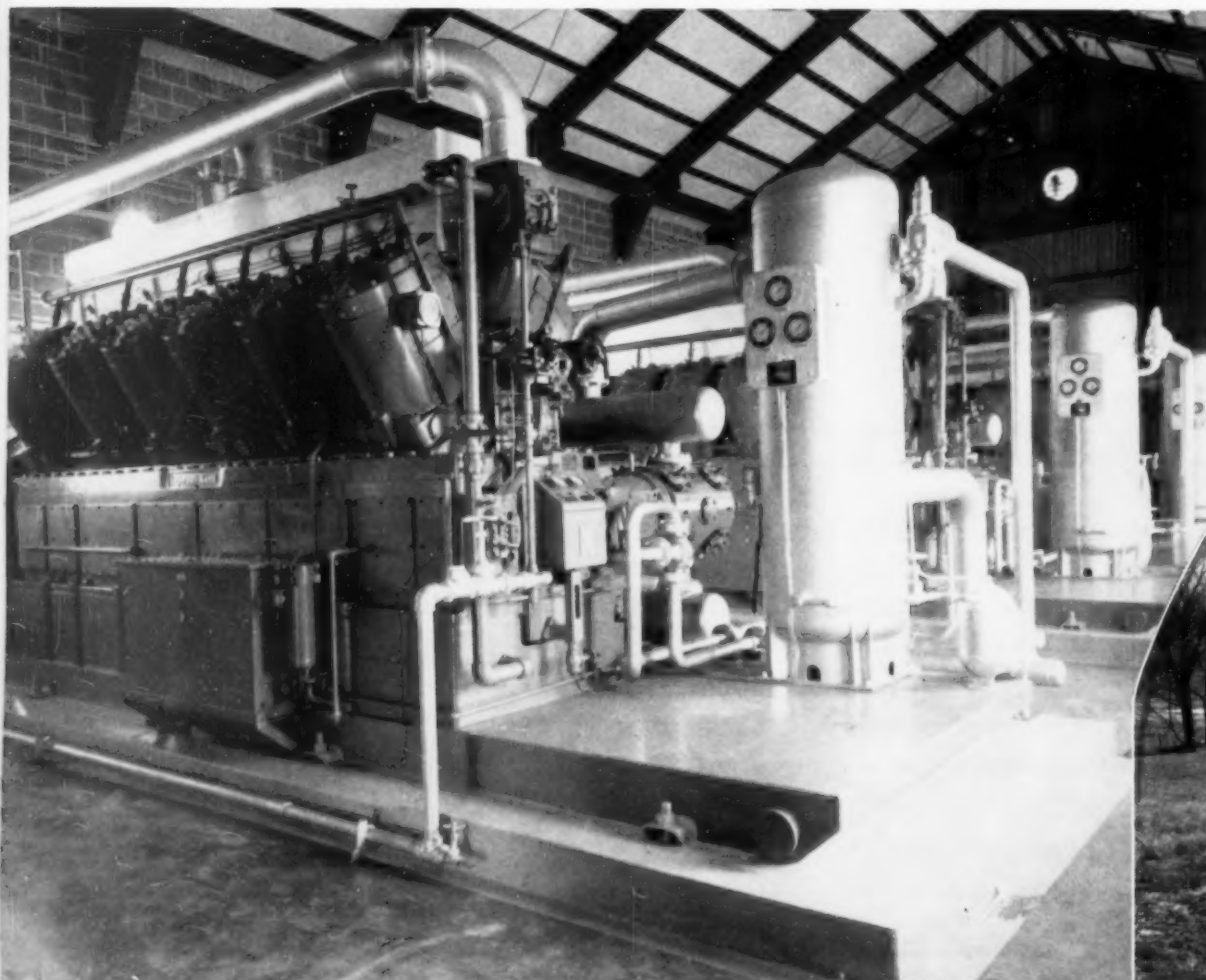
100,000 St. Louis homes with economical natural gas and another 100,000 wanted service. Unfortunately, the heating load required high volume for a relatively short season. Cost of doubling the pipeline supply to meet the seasonal peak would be prohibitive and above-ground storage tanks also would be so costly as to require impossibly high rates to users.

The only answer was natural underground storage, but the area had no exhausted gas fields such as had been used for this purpose in other cities. Geological exploration, however, uncovered an area 18 miles north of St. Louis where a dome of porous sandstone a quarter mile down was sealed above and below by impervious layers of shale and sealed at the circumference by salt water. Shallow well drilling began in 1953 to explore for the structure indicated by the State geological survey. The shallow well program covered 25,000 acres and proved the existence of the structure sought. The first deep test well was drilled in July, 1953, and struck oil in the Trenton formation at 950 ft, another evidence of the existence of the structural anomaly. This well was continued to 3240 ft, penetrating the entire sedimentary phase. St. Peter sandstone was found at 1450 ft, a stratum 100 ft thick with good porosity and permeability.

Additional tests were conducted to make sure the cap rock would hold the gas in. Hydrostatic tests of the core showed the cap rock impermeable. Consistent difference in pressure of water wells drilled to cap rock and to the sandstone proved there was no communication between the two strata. With all signposts pointing to success, Laclede began leasing storage rights. Gas storage would in no way affect surface use of the land and the company further agreed not to use any mineral or potable water bearing strata. Construction of injection wells and a compressor station was begun in February, 1955, and the first gas was pumped down into four wells on December 2nd of that year. Five wells were added in 1956 and five more are being drilled in 1957, with a probable total of 20 wells contemplated. To raise gas to the required injection pressure, Laclede installed three type SVG Ingersoll-Rand gas engine-driven compressors. Each of these units has 12 power cylinders (in V formation) of 11¾-in. bore and 12-in. stroke driving four compressor cylinders, two 10-in. by 12-in. first stage cylinders and two 5½-in. by 12-in. second-stage cylinders.

The location north of the city is ideal. Natural gas comes to St. Louis from the south through the

42



Major pieces of equipment in Laclede's gas storage program are these three Type SVG Ingersoll-Rand gas engine-compressors. Each unit consists of a 12-cylinder V-type gas engine driving a 4-cylinder 2-stage horizontal compressor.



Mississippi River Fuel Corporation's pipe line from the Monroe field in Louisiana. All that was necessary was to extend lines from the city distribution system north to the compressor station. When customer demand is below line capacity, the excess flows on to the storage area. When demand exceeds pipe line capacity, gas can be fed to the city from both north and south. No expansion of lines through the city was required to carry gas to and from storage. Gas reaching the compressor station first passes through a scrubber, then an orifice and recording meter to the 24-in. intake manifold. An 8-in. line carries gas from the manifold through a scrubber to the first-stage cylinders of each compressor. Then the gas is cooled in a fan-cooled radiator, passed through another scrubber and fed to the second-stage compressor cylinders. After another pass through the cooler, the gas flows through a 6-in. line to the 20-in. discharge manifold and then through a series of lines to the injection wells in the field. The engine-compressors, scrubbers, manifolds and coolers are part of a J. B. Beaird Co. package compressor plant.

Use of electric motors to drive auxiliary equipment has been eliminated wherever possible. An I-R centrifugal pump, chain-driven off each engine, circulates cooling water through engine jackets and the air-cooled radiator. Another engine-driven pump sends lubricating oil through the engine-compressors, both clay and waste-packed filters, and through the cooler. The radiator fans are driven by hydraulic motors powered by pumps V-belted to sheaves on the end of each engine crankshaft. Jacket water and lube temperatures are controlled automatically by thermostatic valves. Fuel

gas is taken from the incoming line after the first scrubber and is passed through a separate displacement meter to measure fuel consumption for the plant. Starting air is provided by a pair of I-R compressors. At each well head there is Christmas tree with hand operated valves and an orifice meter run and recording meter. There is a cross-over line at the manifold so that gas can be metered on either injection or withdrawal. Average suction pressure to the compressors is 50 to 125 psig. The first million cubic feet were injected at 670 lbs., just 100 lbs. above the original field pressure. This differential is considered conservative but it is the goal of Laclede's engineers to reduce the differential and lessen injection pressure as gas volume increases. Currently, gas is injected at 655 psig. Injection is continuous as long as gas is available. The only interruption comes during cold weather when home heating demand equals or exceeds pipe line supply. Maximum injection rate is 16 million a day, the capacity of the compressor station. Actual injection volume is regulated by discharge pressure which operators keep at the prescribed level. With more wells in service, the field is expected to accept a greater volume of gas at lower pressure. Additional compressor capacity may be required at a later date.

The 1956-57 winter was mild and by January 1957 the company had 2 billion cu ft in storage. The first commercial withdrawal was made successfully in November and the first sustained withdrawal (80 million in 6 days) was made in January. Total withdrawal for the season was a modest 150 million but it definitely proved the success of the project. Gas withdrawn from storage is reduced to 150 lb

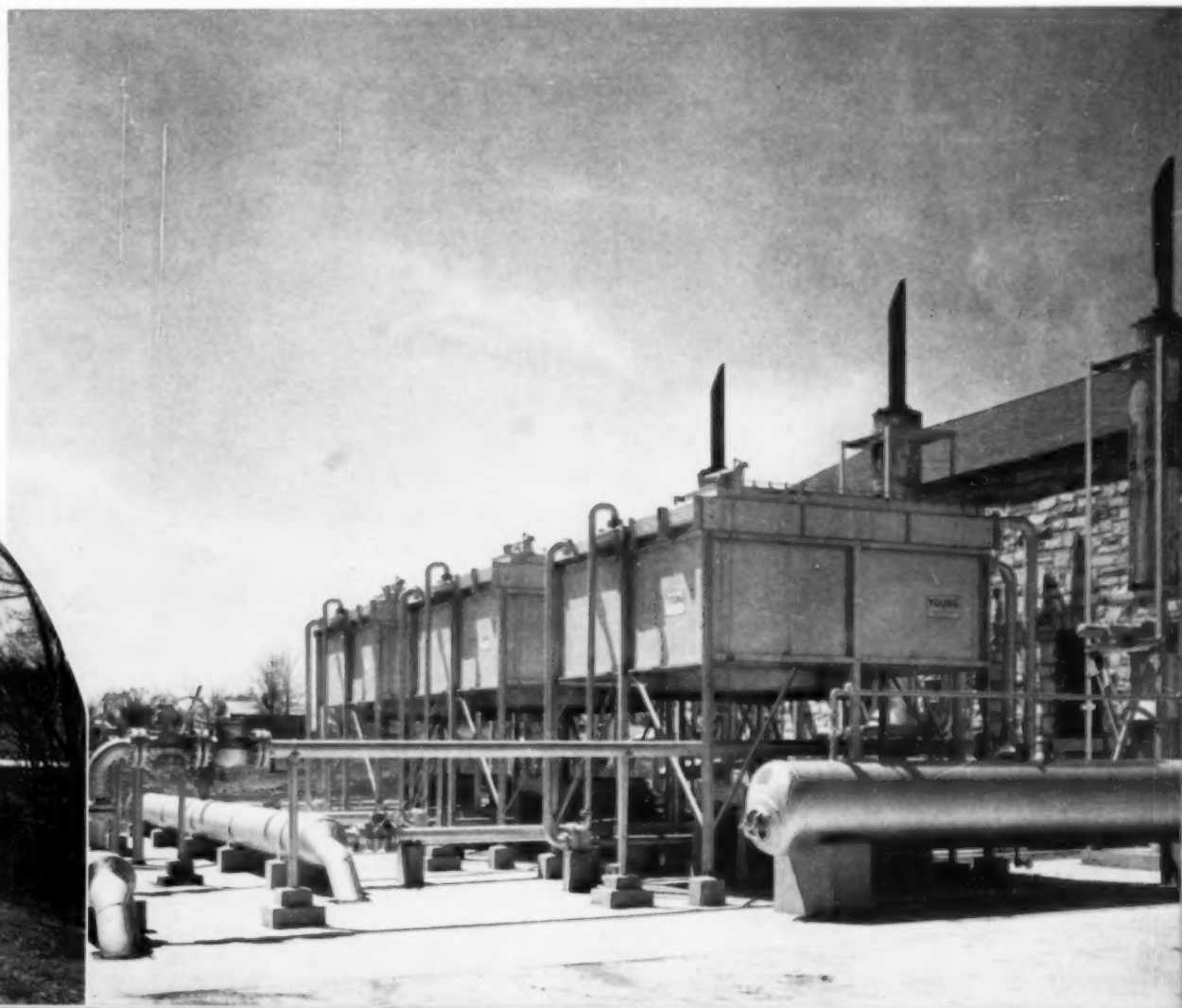
pressure and is passed through a gas-fired heater to maintain a discharge temperature of 70 deg. As of August 23, Laclede had 3,866 million in storage with some 100 days ahead to build the reserve. The company expects to withdraw a maximum of 100 million a day during the 1957-58 winter with a possible total withdrawal of a billion for the season. This will increase substantially as additional householders are permitted to install gas heating equipment. For Laclede, successful development of the underground storage project means important expansion of sales potential. For St. Louis customers, those Ingersoll-Rand compressors this summer are storing up this winter's clean, convenient, economical gas heat.

Laclede Storage Equipment Listing

Engine-Compressors	Type SVG natural gas engine driven compressor with 12-cyl V-type engine and 4-cyl 2-stage horizontal compressor. Ingersoll-Rand
Lube oil filters	Cuno
Fuel meter	Emco
Magnetos	American Bosch
Cooling water pumps	Ingersoll-Rand
Coolers	Young Radiator
Exhaust silencers	Maxim
Air filters	American Air Filter
Lubricating oil	Standard Oil Co. (Ind.)
Starting air compressors	Ingersoll-Rand
Thermostatic valves	Fulton Syphon and Amot

Natural gas, engine cooling water and lubricating oil all are cooled in these Young fan-cooled radiators. Fans are driven by hydraulic motors. Also seen are the Maxim exhaust silencers, American Cycoil air filters, Nordstrom valves, and Nooter starting air tank.

These attractive stone buildings are Laclede Gas Company's storage compressor station, with three Ingersoll-Rand engine-compressors sending natural gas down into the ground so that the company can heat additional thousands of St. Louis homes this Winter.



Fine New Quarters of Cummins Diesel Michigan Inc.

By J. W. BROWN*

DURING the last decade several engine and equipment manufacturers have seen fit to provide their distributors and dealers with partial or complete building and decorating plans leading to uniformity of appearance. This gives a quality of identification to the showrooms, parts and service departments as a part of the overall merchandising plan. Coupled with the uniform trim of service trucks, parts packaging and window and building signs, such uniformity of design and color tends to help strengthen the immediate recognition of the place among customers and prospects. It also makes a definite "tie-in" with the manufacturer's national advertising.

A very good example of this is the new building into which Cummins Diesel Michigan Inc. of Detroit recently moved. Following the Cummins plans, for which Harry Weiss and Associates of Chicago was responsible, this new distributor building is spacious yet handy, light, airy, pleasant and attractive without being ornate. It utilizes basic building materials such as concrete block and wire mesh to best advantage and above all it lifts commonplace materials out of the ordinary by a really modern application of color. Color is everywhere in this building—in shades that contrast and liven

things up without clashing. The color scheme includes white on walls and ceilings, old gold on trim and shop doors, charcoal gray on lower walls, black, blue, red, green and coral. Exposed conduits and piping are made unobtrusive by being painted the same colors as the walls and ceilings; benches and tool stands in the service area are uniformly old gold, tool boxes are red and even the waste barrels are attractively enamelled.

To the Cummins Diesel Michigan personnel, however appreciation for their new quarters is not limited to a liking for the new color scheme. They appreciate even more the elbow-room, ease of parking and maneuvering the big trucks they service and all-round convenience of the building as compared to their old quarters, which were about as dark, murky and cramped as can be imagined. Previous to the move, Cummins Diesel Michigan Inc. was located in an extremely narrow old building on Gratiot Avenue in the downtown Detroit area—the old Detroit Horse Auction building. Service capacity was limited to a maximum of 9 trucks and the work was performed in a single lane tunnel-like area with doors only at front and back. At least 30% of their truck parking had to be done on the street and several units had to be moved



out every time a single job was completed. The service area (called the "coal mine" by their mechanics) was windowless and practically unventilated. One smoking exhaust would make the entire room so foggy you could hardly see.

Contrast this with present working conditions and you can see why the Cummins Diesel Michigan Inc. employees are practically "walking on air" these days. The service area now provides 18 huge truck service bays—nine on each side of the plant with exhaust piping for each bay—fans for summer cooling and modern overhead heating units. Just back of the service area and immediately adjacent to the building there is over an acre of parking space where trucks may be parked or trailers may be parked while the tractors are being tuned up. Centrally located between the truck bays in the rear of the building is a huge glass-enclosed room devoted to engine, fuel-pump and injector repair in dust-free conditions. Just ahead of this are glass-enclosed Parts and Service Managers' offices with sound-proofed ceilings and a huge parts and new-engine storage room with a parts counter opening conveniently to one side of the building. On the other side of the building, in front of the left-hand bank of service bays is a cleaning room with a new Malsbury Model 250 high-pressure steam cleaner and a large hot tank where engine blocks and large sub-assemblies are dipped for cleaning in a 140° solution of Magnus 61RS. Magnus 115 is used in the steam cleaner and Magnus 755 for cleaning aluminum parts.

Between the cleaning room and front offices are, in order, an engine dynamometer room, a chassis

Engine dynamometer room at Cummins Diesel Michigan Inc. is arranged to take care of two engines: one at each end of the Clayton dynamometer.



*Detroit Editor DIESEL PROGRESS



Attractive new 24,000 sq. ft. building of Cummins Diesel Michigan Inc., Cummins Distributors for Michigan and Northwestern Ohio.

Part of the large truck service area at Cummins Diesel Michigan Inc. Capacity is provided to service 18 trucks at once. Engine removal, when necessary, is done by lift truck or by a rolling "A" frame.

dynamometer room and the furnace room. The engine dynamometer room contains a Clayton dynamometer capable of testing engines up to 600 bhp and arranged so that two engines may be mounted at one time. The chassis dynamometer room is kept busy checking truck horsepower and speed after tune-ups. Altogether the Cummins Diesel Michigan Inc. plant covers 24,000 square feet on the first floor, with an attractive lounge and wash-room for customer's convenience on the second floor in front. The general office occupies a relatively small space across the front of the main floor and is flanked by enclosed sales and execu-

tives' offices. Here again the attractive color scheme is evident and pleasing, from the vari-colored doors to the turquoise window draperies.

Currently Cummins Diesel Michigan Inc. is doing an enviable sales and service business but it is evident that the new plant is also planned to be adequate for considerable expansion in the years to come. The new location on Wyoming South of Michigan Avenue is in the very heart of Detroit's trucking industry, convenient to the new Edsel Ford Expressway, Michigan Route 112 and U.S. 12. Locally they service many big-name trucking con-

cerns and are building up a marine clientele as well. John E. Bodkin, the sales manager, estimates that there are about 2,500 Cummins owners in their Michigan and Northwestern Ohio territory with an engine population of from 4,500 to 5,000.

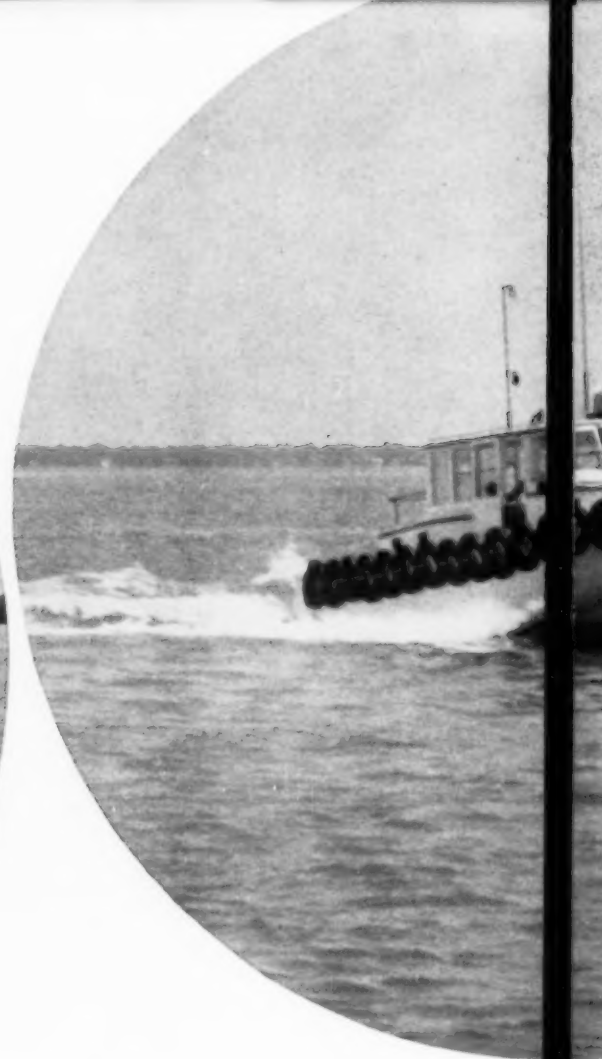
They are supported in their sales and service work by branches in Maumee, Ohio and Grand Rapids, Michigan, by dealers in Toledo, Ohio, Detroit, Lansing, Muskegon, Kalamazoo and Petosky, Michigan and have opened negotiations for additional dealerships in Fremont, Ohio, Saginaw and Jackson, Michigan.

Clayton chassis dynamometer room at Cummins Diesel Michigan Inc. Wire mesh safety guards are ordinarily placed over the rear wheels before trucks are tested.



The Cummins Diesel Michigan Inc. executives: (Left to Right) Ivan Barry, Service Manager, Les W. Childs, President, John E. Bodkin, Sales Manager, Roy Clawson, Office Manager and John Kitchen, Parts Manager. John S. Shales, Vice President, was out of town when this picture was taken.





NEW TAMPA PILOT BOAT

Powered by a Diesel for Safety and Economy. Vessel Saves \$12,000 a Year on Fuel, Cuts Risk of Explosion by Using Oil Instead of Gasoline; Boat Tops 18 Knots.

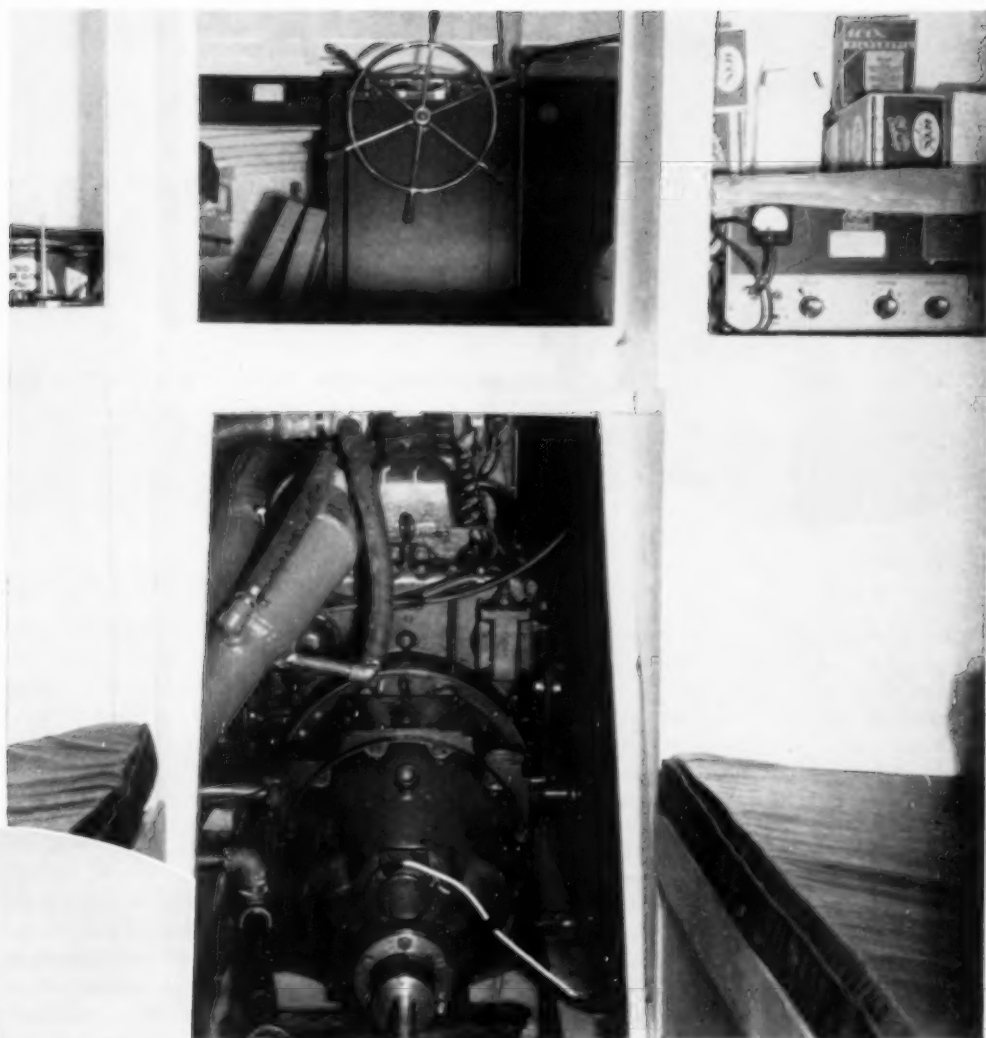
THE new *Tampa Pilot*, put into service in July, 1956, by the Tampa Bay Pilots Association, has improved service, enhanced safety, and reduced fuel costs more than \$1,000 a month. Instead of the conventional gasoline engine, this pilot boat is powered by a 205-hp Fairbanks-Morse marine diesel. Tampa has long been a world port, but its importance and traffic have grown swiftly in recent years with the development of industry on the shores of the ample harbor. The Pilots Association has improved its equipment to meet the added load so that service to ships could be maintained at a high level of speed and efficiency. Three years ago, Grady Thompson designed and built at his Tarpon Springs yards the pilot boat *Tampa Bay* which was powered by a 275-hp gasoline engine.

Experience with the *Tampa Bay* was so satisfactory that the pilots decided to duplicate the vessel and

commissioned the Thompson yards to build the *Tampa Pilot*. The new boat has an overall length of 40 ft 8 in., a beam of 12 ft 3 in., a hull depth of 9 ft and draws just 3 ft 6 in. of water. Framing is of Florida Cypress and planking of Florida white cedar—both chosen on the theory that native woods prove more durable. In place of a gasoline engine, the pilots decided to install a diesel and chose a 6-cylinder model 49B4 $\frac{1}{2}$, two-cycle Fairbanks-Morse engine of 4 $\frac{1}{2}$ in. bore and 5 $\frac{1}{2}$ in. stroke, rated at 205 hp at 1800 rpm. Major reasons for switching to a diesel were to improve performance, reduce safety hazards and cut operating costs. Pilot boats must be fast and seaworthy to do their job properly. The boats go out from the pilots' station 9 miles to a sea buoy, working in all kinds of weather. Speed is important when traffic is heavy or when one comes in to port without notice. In both cases a fast pilot boat means better service to ship-

ping. The *Tampa Bay* was considered a fast boat at 16 knots, but the new *Tampa Pilot* made 18.1 knots on her trial run. The new vessel performs like a speed boat, lifting her bow up out of the water as her speed increases.

The big dollar savings were achieved in expenditure for fuel. Comparisons are easy since the pilots have two vessels identical in everything but power. One consumes 20 gallons of gasoline an hour at 33 cents a gallon, a fuel cost of \$6.60 an hour. The other uses just 10 gallons of diesel fuel an hour at 13 cents a gallon, a fuel cost of \$1.30 an hour. This means a saving of \$5.30 an hour. Operating 200 hours in a month, the diesel on the *Tampa Pilot* saves \$1,060.00, which adds up to the impressive total of \$12,720.00 for a year of average operation. The diesel is mounted under the floor of the pilot house. Hatches can be removed easily, making the engine readily accessible for servicing from either the pilot house or the cabin aft. The diesel drives a Columbian propeller of 24-in. diameter and 24-in. pitch through a Snow-Nabstedt reverse-reduction gear with 1.5 to 1 ratio. To provide electricity for lighting and other equipment, the engine also drives a 750 watt, 32 volt generator through a front-end power take-off. The diesel itself has a Delco-Remy electric starter with Goulds batteries. The boat has two fuel storage tanks, one on either side of the engine compartment, with a capacity of 200 gal. Fuel oil is moved from storage by a built-in engine-driven pump which supplies the oil through a Purolator filter to the Roosa-Master fuel injection system. Cylinder head, cylinder liner, and full-length cooling water jacket are permanently



➤ Power unit of the new *Tampa Pilot* is this model 49B4½ Fairbanks-Morse diesel, rated at 205 hp at 1800 rpm. The diesel saves more than \$1,000 a month on fuel compared with an identical gasoline-powered boat. The RCA telephone is at right, with Wix re-fills above. To the left will be seen Kendall oil in cans.



The *Tampa Pilot* moves at high speed through the waters of Tampa harbor. The new boat handles the bulk of the work, and is in service about 200 hours a month. A view of the new pilot boat as she pulls away under full power. Success of the diesel craft has led the pilots to consider converting a sister vessel from gasoline to diesel.

assembled as a single unit. Cooling water is circulated through the jackets by an engine-driven pump and is cooled in a built-in head exchanger. An engine-driven gear-type pump sends Kendall detergent-type lubricating oil under pressure to the bearings and all other moving parts. The lube circuit includes a full-flow strainer and a pair of Wix cartridge-type by-pass filters.

Scavenging air for the two-cycle diesel is drawn through an Air-Maze oil bath air filter to a positive displacement blower built into the engine. The air filter is mounted in a corner of the engine compartment to save height, since the engine is installed under the floor. The boat has complete modern control, navigational and communications equipment including RCA ship-to-shore radio-telephone. The members of the Tampa Bay Pilots Association are known to ship captains round the world and are determined to maintain their reputation for swift professional service. The new *Tampa Pilot*, plowing through the waters of the busy harbor at 18 knots by her heavy-duty F-M diesel, is helping them to do that job. Greater safety and substantial dollar savings are diesel dividends.



WHAT'S GOING ON IN ENGLAND

CONDUCTED BY BERNARD W. LANSDOWNE

Bernard W. Lansdowne is an associate member of the Institution of Mechanical Engineers and is widely known among British and European diesel manufacturers as a former editor of our English contemporary "Gas & Oil Power." His early workshop training was spread over seven years with A.E.C. Ltd., Southall, following which he served some five years with that company's sales engineering department. He is now specializing in industrial advertising with Roles & Parker, Ltd. in London.

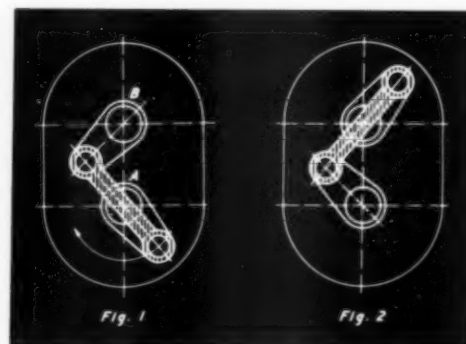
Hand Starting Diesel Engines

TO facilitate diesel engine starting without electrical aid, numerous alternative systems are now available, including hydraulic, compressed air, cartridge and inertia operated designs. A recently announced non-electric diesel starter is an inertia type for which Inertia Starter Developments Limited of 177 Regent Street London, W.1. hold world patents (excluding the British Commonwealth and Ireland but including Canada). The main problem in manual starting is to produce a powerful impulse to bring the engine as quickly as possible to the highest achievable speed. The new inertia starter design is based on the principle in which the speeds of the two masses in question, the inertia mass in the starter and the engine flywheel, are matched by introducing an infinitely variable transmission between them. This transmission gives essentially an infinity-to-one ratio at the beginning when the inertia mass spins fast and the engine flywheel is stationary. This ratio gradually and smoothly decreases to one-to-one in the middle of the transfer period and further to one-to-infinity when the inertia mass stops and the engine flywheel spins fast. Initial coupling is achieved by an ordinary dog clutch and there is no friction anywhere in the transmission except unavoidable losses in journals and between the teeth of the gears. These losses are kept to a minimum by enclosing the whole

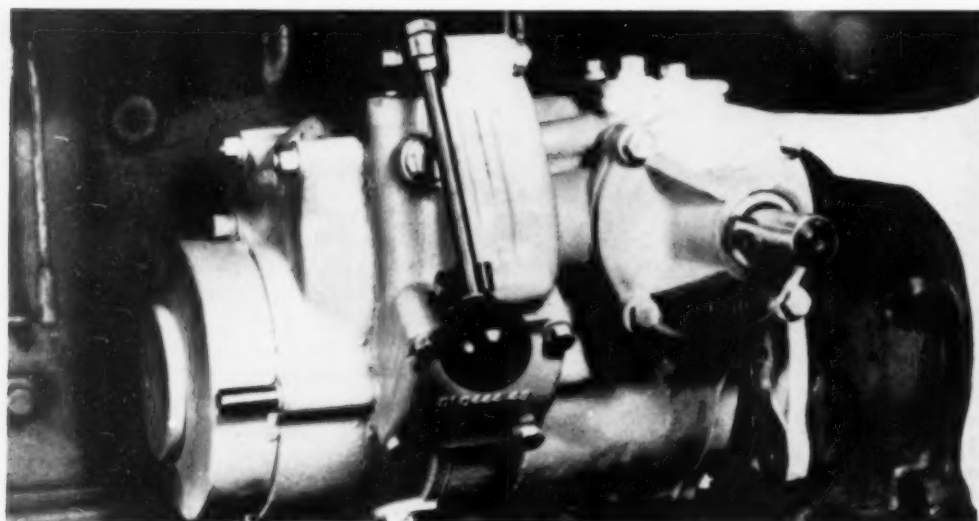
mechanism in an oil bath. The starter consists basically of a means for transferring a rotary momentum from one mass to another and it incorporates a gear mechanism, the input and output members of which are constrained to limited angular movement between extreme positions with an accompanying progressive change in gear ratio from a starting value approaching infinity-to-one to the final value of one-to-infinity.

The gear mechanism is constructed so that if the inertia mass is rotated at high speed and clutched to the input member, an engine flywheel coupled by a one-way clutch to the output member is accelerated from rest until the extreme configuration corresponding to the final value of the gear ratio is reached. When almost all the momentum of the inertia mass has been transferred to the flywheel the first is practically brought to rest. The essential part of the gear mechanism consists of two cranks, (A)-input and (B)-output, with their axis parallel. These cranks are laterally spaced and interconnected by a link in the form of a connecting rod. In the initial position as shown in the drawing, the axis of the connecting rod passes through the axis of the input crank whilst in the final position it passes through that of the output crank giving the respective transmission ratios. The input crank can be brought into connection with the

inertia mass at the appropriate moment by way of a dog clutch and reduction gearing, whilst the output crank is connected to the conventional axially movable starter pinion by means of a step-up gearing.



Before the actual starting, several auxiliary movements are executed automatically by handwinding. These include resetting the cranks to the initial position; bringing out the starter pinion into mesh with the starter ring of the engine, and speeding the inertia mass to the required speed. The auxiliary mechanism is so arranged that it rotates the engine slowly when the mass is speeded up. This slow rotary movement helps to distribute the oil in the engine and generally prepares it for the start. This movement also takes up all existing backlash in the gearing and bearings assuring a shockless and smooth start. When the required speed of the starter flywheel is reached an acoustic signal is automatically emitted and the operator can let in the dog clutch on the input crank. The cranks then rotate from the initial position to the final one in the course of which revolution the transmission ratio falls continuously till the inertia mass is brought to a standstill all its energy being transferred to the starter pinion and through it to the engine flywheel. At this point the starter mechanism is brought to rest by a stop. The Bendix is overrun by the engine flywheel and the pinion is thrown out of engagement. The dog clutch is then released and the starter is ready for the next start. This inertia starter is adaptable to all types of engines up to 1.2 litres capacity per cylinder without alteration of the engine design. It weighs only 73 lb complete.



USE OF RESIDUAL OIL AS DIESEL FUEL

Chapter One Appeared in the December, 1957 Issue.
This is Chapter Two and Chapter Three Will Appear in the
February, 1958 Issue.

By EDWARD B. RAWLINS*

CALCIUM & SODIUM—Calcium and sodium are present in varying amounts in all residual fuels, usually in the form of sulphates. If present in material quantities, they may under some conditions contribute to a deposit condition, especially in the ports of 2 cycle engines and on the exhaust valves of 4 cycle (fig. 2) engines. Some reports indicate that such deposits under certain conditions of heat are corrosive. Sodium often appears in the form of sodium chloride, getting into the fuel during tanker transportation from contamination by sea water. In the form of salt, it is quite corrosive and deposit forming. The limits established for both calcium and sodium have been based on the amounts of these elements found in fuels that have been used successfully. It is entirely possible that higher percentages could be tolerated. However, until such time as experience indicates differently, the present limits should be adhered to. Fig. 2 appears on page 4, December issue.

SUMMARY—In considering any residual fuel as a fuel for diesel engines, the foregoing is offered as a guide for the selection of fuels. The limits established have been based upon considerable experience. The limits are broad enough to permit the selection and use of the majority of available residual fuels. It is entirely possible that fuels may be encountered that are in one way or another outside the limits, yet provide a satisfactory operation. In the case of such fuels, consideration must be given the fuel in question. Decision as to whether or not to use it must be based on many factors,

such as availability of better fuels, how far a fuel exceeds the limits, etc.

PROCESSING SYSTEMS—All systems for the preparation of a residual fuel for use as a diesel fuel must of necessity follow a general pattern. A typical flow diagram (see diagram 1) which illustrates one installation in successful operation, can serve as a guide for a fuel processing system for any installation. The Diesel Engine Manufacturers Association (DEMA) have a DEMA Standard Residual fuel processing system and commentary on fuel characteristics which will shortly be published in their Standard Practices Manual. It is essentially the same as the one shown in diagram 1. A processing system should provide a simple straightforward flow of the fuel from bulk storage to the engine fuel system. To follow the flow through such a system will probably be the best way to describe the operation of the plant. From bulk storage, fuel is drawn by a transfer pump through a strainer, pumped through a heat exchanger to centrifuges. Bulk storage facilities should be ample so maximum advantage can be taken of the lower prices prevailing in the summer or off season or other price concessions that might avail themselves. In some colder locations, due to ambient conditions, heated bulk storage may have to be provided or tank suction heaters installed so that the fuel can be pumped. In warm climates such as Florida these precautions are not necessary. Diagram 1 appears on page 2 of the preceding chapter.

Fuel transfer pumps should be duplexed if, continuous, uninterrupted service on the fuel being handled is wanted. Otherwise, single pumping units are satisfactory. This is also true of the circulating pumps, unless spare pumps and motors are available in the event of pump failure or motor burnout. The transfer pumps should be sized so as to have a capacity of about 50% more than the maximum capacity of the centrifuges. The pump relief valves, which return excess fuel to the pump suction, should be set at about 40 psig for the line to the centrifuges. The primary heater should be of the proper size to raise the temperature of the fuel, from storage temperature, to about 200°F at the rate of the maximum capacity of the centrifuges. Such a primary heater may be either steam or electric. When available, waste heat can be utilized for this service. Otherwise, a small, packaged, automatic boiler must be installed.

The step following the primary heating phase is the centrifuging of the fuel. This operation is one of the most important functions in the processing system. It depends not only on the cleanliness of the fuel but also maintenance of the fuel injection system. The centrifuging must be done at a throughput rate low enough to permit the removal of all free sediment and water. The lower the viscosity of the fuel, the easier and quicker this can be accomplished and the higher the throughput. Since a viscosity of 200 ssu or less is desirable for this purpose the fuel is often heated

*Engineer—Fuels and lubricants, The Cooper-Bessemer Corporation

Figure 3—
Another valve from this same engine with heavier deposit of the same composition as Figure 2. Blow-by has started with this valve due to the deposit holding the valve off the seat.



Figure 4—
Valve from another installation, but from the same size and model engine. Shows deposit and condition of the valve seat. Blow-by has destroyed this valve as evidenced by the deep, burned cavity in seat. See Figure 2 on fourth page of chapter 1, December issue.



Figure 5—
A burned out valve seat insert with considerable deposit. This seat was mated with the valve in Figure 4.



for centrifuging. A No. 6 fuel having a viscosity of 45 ssf @ 122°F would require only about 150-160°F to provide a proper centrifuging viscosity. A 300 ssf @ 122°F fuel would require a 200-210°F temperature to accomplish the same result. A centrifuging temperature of 190-200°F is therefore generally recommended for all fuels normally experienced. The function of centrifuging depends upon four factors: (1) The viscosity of the fluid being centrifuged. (2) The difference in specific gravity of the fluid and the particles to be removed. (3) The centrifugal force applied to the particle to drive it out of the fluid. (4) The time the force is applied to the particle and the distance it has to travel. Particle size also affects centrifuging efficiency. The more viscous a fuel, the greater the time required to force a particle of dirt of a certain specific gravity through a fluid of a lighter specific gravity. The centrifugal force and distance the dirt must travel depends upon the design of the centrifuge.

Centrifuges available today include the bowl type, disc type, and several makes of self-cleaning disc type machines. Any present day centrifuges will do an acceptable job of cleaning the fuel. If the cleaning of the centrifuges does not constitute a major labor problem, the manually cleaned machines will provide a satisfactory installation. If, however, cleaning imposes a problem, the self-cleaning machines are desirable. As would be expected, the self-cleaning centrifuges are somewhat more expensive than manually cleaned machines. They are larger and have greater capacities. Considering centrifuge cost on the basis of capacity, the cost per gallon of capacity does not vary considerably from one machine to another. It has been found by experience that the throughput of a centrifuge should be somewhat less, for a No. 6 fuel, than the manufacturer's recommendation for a No. 5 fuel. The writer's experience indicates a centrifuging rate of 60% of the manufacturer's low

rate for No. 5 fuel does an acceptable job of cleaning the fuel, providing the viscosity of the fuel at the centrifuge is in line with that mentioned above. If, however, the fuel is more viscous than 200 ssf, at the recommended centrifuging temperature, the centrifuging rate must be reduced. To provide a constant rate of feed to the centrifuge, the 40 psig heated fuel from the primary heater is reduced to about 15 psig by means of a reducing valve and fed to the centrifuge through an orifice. The rate to the centrifuge can then be adjusted up or down to get the proper feed by adjusting the pressure regulating valve. A higher pressure provides more fuel to the centrifuge and a lower pressure less. A sight feed indicator and/or a meter should be provided to give a visual indication or an accurate picture of the centrifuging rate.

Centrifuges should be so sized that they have capacity enough at their residual fuel rating to supply the plant fuel requirements for 18 to 20 hours of operation. To accomplish this they should exceed the plant requirements by 20 to 25%. The centrifuges should discharge clean fuel into a vented day or make-up tank, thus complete the first phase of the residual fuel processing system. The make up tank should be large enough to provide a reserve supply of fuel for the engines during periods of cleaning the centrifuges or in event of temporary failure of the centrifuge. A 1000 to 1500 gallons capacity fulfills most needs. Ample size of this tank also assists in stabilizing the temperature of the fuel in the circulating system. This temperature has been found to stabilize someplace between 210°F and 235°F. Due to temperatures of this magnitude, any water that passes the centrifuge converts to steam and passes out the day or make-up tank vent. As a result, water in the fuel, unless it is present in excessive amounts, is no problem. The second phase of the processing system incorporates the circulating system. Clean fuel is drawn from the day or make-up tank by the circulating pump. The circulating pump should have a capacity of approximately twice the full load fuel consumption of the plant. It should discharge through the secondary heater, through the filter to a header system. The fuel in this phase is heated

and carried to the header at about the temperature required by the engine for proper atomization and at about 50 to 60 psig pressure. It is necessary to maintain a pressure of this order to keep the fuel in a liquid form and assure proper filling of the high pressure pump or fuel pumps. The temperature in this phase should be about 225°F. Although some fuels of more viscous grades may require higher temperatures for proper operation, most fuels will give good operation at this temperature.

Additional heat, if needed for proper injection, will be supplied by the booster heater at the engine. The booster heater is designed to make up any heat lost in the header system due to radiation. It will provide a few degrees additional temperature if needed. The fuel pumped through the header in excess of engine requirements returns to the make-up tank through a relief valve at the end of the header. Although the fuel has been cleaned by the centrifuging operation, a filter placed in the circulating system guards against faulty operation of the centrifuge. Such a filter also picks up any fine particles that for one reason or another have remained in the fuel. The third phase of this operation includes all equipment required for each engine. From the main supply header the fuel (under 50 to 60 psig pressure and at a temperature of about 215°F to 225°F) is fed to the individual engines through an electric booster heater. A steam heater can be used if desired but steam and condensate piping is more expensive and complicated than electric wiring. The fuel is then fed through additional filtration to a pressure reducing valve that reduces the pressure down to about 30 to 35 psig. At this pressure the fuel is delivered to the high pressure pump or injection pumps. A fine strainer is provided just before fuel goes to injection system as a final precaution against any dirt getting into the system.

Through an arrangement of check valves, the regular light fuel system takes over automatically,

Figure 6—
Valve and seat burned out after eight days of operation. Deposits on the valve face caused the valve to be held off the seat permitting the combustion gases to blow through.



Figure 8—
Right hand valve in Figure 7. Shows pitting of the valve face. Note mottled surface of the valve.





Figure 7—
Heads of two different valves from same engine. In case of the head on the left, valve face deposits are in evidence. Valve on right shows little deposit but excessive pitting on the valve face. Destruction of this valve probably caused by improper seating due to some deposit holding the valve off the seat and permitting the initial blow-by.

should the heavy fuel system fail, the light fuel being available all of the time at about 20 psig. All drips from the fuel pumps, nozzles, etc. are gathered together and returned to the make-up tank either by gravity or by a drip return pump. In any discussion of a residual fuel system, it should be pointed out that hot residual fuel is extremely hard to keep confined. As a result all pipe and fittings in the system should be welded.

OPERATION: For those responsible for the operation of a diesel plant on residual fuel the following operating procedures will prove helpful and answer questions commonly asked. (1.) Diesel engines must always be started and stopped on light fuel. In starting, they should be run long enough on light fuel to warm up. 15 to 20 minutes are usually long enough, even though some operators prefer to run a little longer. In taking a unit out of service, the engine should be switched to light fuel and operated on this fuel long enough to permit the injection equipment to thoroughly cool down to a normal temperature and to permit the injection system to be thoroughly purged of all residual fuel. Here again, 15 to 20 minutes of operation is usually sufficient. If an engine has an

emergency shutdown or is shut down without thorough cooling down, sticking or frozen injection equipment may result. Should this occur it will be necessary to free the stuck or frozen part or parts before attempting to start again. (2.) No attempt should be made to switch an engine over from light to residual fuel until hot residual fuel at a stable temperature is available at the switch-over point. That is, do not put an engine on residual fuel until the residual fuel is up to the proper operating temperature.

(3.) Keep the fuel temperature up to the proper operating temperature. Fuel that is too cold does not completely burn in the time that it should. The result is to cause a smoky or even black exhaust, excessive valve deposits, after burning and contamination of the lubricating oil. Often as few as 10 or 15°F makes the difference between a clean operating engine and one that is dirty and creating continuous maintenance problems. Although the fuel should be hot enough to insure its proper use, care should be taken not to go overboard in the matter of fuel temperature. A fuel that is heated to too high a temperature may have a tendency to crack and produce varnish deposits in

the injection apparatus, causing sticking and annoying maintenance problems. A good rule to follow is to operate at the lowest temperature that will give good combustion and a clean exhaust stack. For example, if the fuel temperature at which an engine is operating shows a slightly hazy or smoky exhaust raise the fuel temperature gradually until the smoky condition ceases. An additional 5° or 10°F increase in fuel temperature from this point will insure continuously clear operation. These observations are, of course, based on the assumption that the engine itself is in good condition and in proper adjustment.

An explanation of the combustion process with residual fuel might be helpful at this point. When a fuel is injected into an engine cylinder, it reaches the combustion chamber in the form of very small droplets or globules. The size of these droplets or globules depends first upon the viscosity of the fuel being injected, second upon the injection pressure, and third, the size of the orifices in the nozzle tip. Inasmuch as viscosity is a factor in the droplet size (and heat controls viscosity) it is important to maintain correct fuel temperatures to keep the viscosity down and reduce droplet size.

Once the droplet is injected into the cylinder, it contacts the air in the cylinder, which is hot from heat of compression, and absorbs heat from the air until it reaches its autogenous ignition temperature and begins to burn. In the burning process, the droplet of fuel is not instantly burned but burns relatively slowly from the outside surface of the droplet inward. For this reason it is important to keep the droplet size small by keeping the viscosity down and the heat up. If the droplet size is too big, the burning cannot be completed before the exhaust valve opens with the result that the burning mass of fuel passes out the exhaust. In so doing some of these burning droplets hit the relative cool exhaust valve, or ports in the case of a two cycle engine, and deposits as a sticky mass. Considerable buildup of a carbonaceous or slag-like material may break off in spots and permit hot combustion gases to wire-draw thru the opening and eventually burn the valve.

Figure 9—
Photomicrograph through the seat of the valve under the deposit. The black band between the Bakelite mounting and the valve shows the thickness of the deposit. Specimen was unetched and magnified 100 times.



Figure 10—
Same specimen as Figure 9 but etched and magnified 250 times. Note how corrosion followed the grain structure of metal.

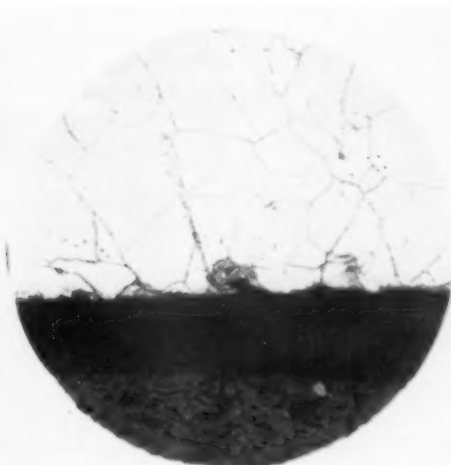


Figure 11—
Photomicrograph of a section through the seat of the dark colored valve shown in Figure 7 and 8. Specimen is unetched and magnified 100 times.



ASME Gas Turbine Conference

With an outstanding series of papers and exhibits already planned, the conference of the Gas Turbine Power Division of the American Society of Mechanical Engineers will be held March 3-6, 1958, at the Shoreham Hotel in Washington, D. C. General Chairman Frank J. Smollon has announced. More than 900 gas turbine experts from across the nation and other countries are expected to attend the conference. Meetings will be held each morning Monday through Thursday, and each afternoon with the exception of Wednesday, when a special field trip will be arranged. The annual banquet will be held Wednesday night, with an excellent speaker being engaged for this highlight.

According to Exhibits Manager J. M. Clark, these firms have definitely committed to show thus far: Austenal, Inc.; Bendix Aviation Corp.; Boeing Airplane Co.; Brown Boveri Corp.; Burgess-Manning Co.; Clark Bros. Co.; Cleveland Diesel Engine Division, GMC; Cleveland Graphite Bronze Co.; Fabricast Division, GMC; Franklin Institute; Fornsprag Co.; Garrett Corp.; General Electric Co.; Haynes Stellite Co.; International Nickel Co.; Lucas-Rotax, Ltd. Also, Lycoming Division, Avco Mfg. Corp.; North American Aviation Co.; Wm. W. Nugent & Co., Inc.; Oil Engine & Gas Turbine Magazine; Solar Aircraft Co.; Thompson Products, Inc.; Westinghouse Corp.; Woodward Governor Co.; Diesel and Gas Turbine Progress Magazine. All exhibits are limited to various types of gas turbine power plants, component parts, materials, including fuels and all accessories.

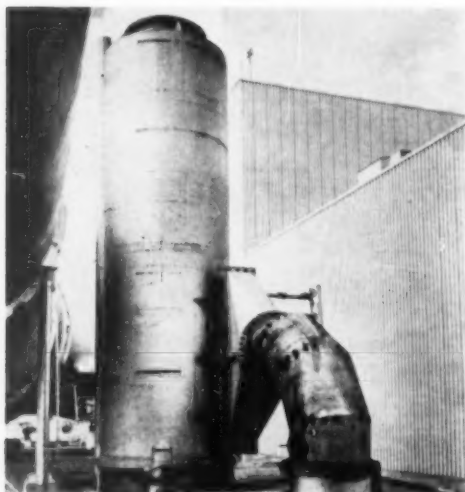
Citing the fact that experts in the gas turbine field will appear at the sessions, Program Papers Chairman J. J. McMullen of the Hudson Engi-

neering Co., Hoboken, N. J., has announced this partial list of papers to be presented: *The 'Auris' New Gas Turbine Project*, by John Lamb, American Consultant for the Shell Petroleum Co., Ltd.; *Controlling a Marine Gas Turbine*, by F. H. Van Nest, Manager of Design Engineering, General Electric Co.; *Operating Experience of General Electric Gas Turbines*, by J. E. Linville, Manager of Product Service, General Electric Co.; *Economic Considerations in Applying Gas Turbines to Electric Utility and Industrial Applications*, by C. R. Dygert, Product Planner for General Electric Co.; *A new 8500 kw Gas Turbine Generator Unit*, by R. E. Strong, Design Engineer, Westinghouse Electric Corp. Also, *Gas Turbines for Blast Furnace Blowing*, by K. L. Rieke, Design Engineer, Westinghouse Electric Corp.; *Present State and Future Outlook of the Free-Piston Engine*, by R. Huber, Directeur Technique de la Societe d'Etudes Mechaniques et Energetiques, France; *The Performance and Reliability of Aero Gas Turbine Combustion Chambers*, by J. S. Clarke, Joseph Lucas, Ltd., England; *Small High Speed Rotor Bearing Problems and the Floating Slipper*, by H. C. Hill, Mgr., Boeing Airplane Co.; *The Compres-A New Concept of Diesel Supercharger*, by F. J. Gardiner, Manager, Engineering Products Section, and Max Berchtold, Engineer-in-Charge, Compres Engineering I-T-E Circuit Breaker Co.; *Non-Steady Aerodynamics of the Compres Supercharger*, by Hans N. Burri, Senior Analytical Engineer, I-T-E Circuit Breaker Co.; *The New Gas Turbine for Steel Industry*, by Z. Stanley Stys, Vice President, Brown Boveri Corp.; *Nuclear Reactors as an Energy Source for Gas Turbines*, by Louis H. Roddis, Jr., Deputy Director, Division of Reactor Development, U. S. Atomic Energy Commission.

Also, *The Use of Adjustable Stator Blades to Reduce Idle Fuel Flow*, by C. Howard and R. L. Hendrickson, General Electric Co.; *Steam Turbine and Gas Turbine Cycles for High-Temperature Gas-Cooled Reactors*, (Part I—The Heat Power Cycle), by Dr. P. F. Martinuzzi, Professor of Mechanical Engineering, Stevens Institute of Technology, and Ted Jarvis, Ford Instrument Co.; *Plate-Type Air Preheaters for Automotive Gas Turbines with Special Reference to Their Optimization as Regards Weight as Well as Gas Turbine and Vehicle Performance*, by W. Hryniskak, C. A. Parsons & Co., Ltd., England; *The Use of High-Temperature Alloys in the Gas Turbine Field*, by Glen A. Fritzlen, Technical Director Haynes Stellite Co.; *The Experience in the Last Several Years with Burning Heavy Fuel Having Principally to do with Deposit Under Continuous Operation as Compared with Intermittent Operation and Including Some Two or Three Thousand Hours of Operation with 360 ppm Vanadium Fuel*, by Bruce O. Buckland, Consulting Engineer, and Alan Foster, General Electric Co., Gas Turbine Dept.; *Design Features of a New 13,400 hp Single-Shaft Gas Turbine*, by A. N. Smith, Supervisor, Design Unit, General Electric Co.; *Operating Experience with 750/1000 kw Gas Turbine*, by G. B. R. Feilden, Ruston & Hornsby, Ltd., England; *Rearrangement of the Temperature Field in Flow Around a Bend*, by Eckert and Irvine, presented by Thomas F. Irvine, Jr., Assistant Professor, Dept. of Mechanical Engineering, University of Minnesota; *Stage Performance and Radial Matching of Axial Compressor Blade Rows*, by Jeffrey Watkins. For further information concerning this meeting write Barry Freer, 1300 Connecticut Avenue, NW, Washington 6, D. C.

Water Separator Snubber

The limit of a product's service horizon is never really known—new applications develop when least expected. So it is with the Burgess-Manning Water Separator Snubber, originally designed to provide the dual function of exhaust gas silencing and removing of all of the seal water from the exhaust gas of vacuum sealed pumps. A problem arose at the National Advisory Committee for Aeronautics Lewis Flight Propulsion Laboratory at Cleveland, Ohio, in connection with the silencing of the discharge from two eight-cylinder compressors of 40



in. bore and 14 in. stroke, used to exhaust air from a closed chamber to the atmosphere. Oil from the discharge of other vacuum pumps had proved to be quite a nuisance in the area. Initial plans to overcome this situation called for an exhaust head on top of the silencer, into which water would be sprayed, in an attempt to remove the entrained oil from the air stream.

After an engineering study, NACA purchased a Burgess-Manning Water Separator Snubber, eliminating the need and cost of the exhaust head. The B-M Water Separator Snubber that was installed measures 9 ft in diameter and 35 ft tall. It handles up to 100,000 cfm of air and separates up to 1200 gpm of water from the exhaust stream.

The water, introduced in the inlet nozzle of the separator, is used to wash all oil out of the air stream. Water separation and consequent oil separation are close to 100% effective under normal operating conditions. Oil and water drop into a sump below and oil is separated by an overflow arrangement, leaving the water in condition for recirculating. This unique combination of separation and silencing, plus oil removal, represents a noteworthy saving in equipment cost; guarantees continuous, uninterrupted performance and essentially no maintenance. Complete information on this WSS Snubber may be had by writing to the Burgess-Manning Company, 749 East Park Avenue, Libertyville, Illinois.

Caterpillar Executive Vice President



C. A. Woodley

The election of Charles A. Woodley as an executive vice president of Caterpillar Tractor Co. has been announced by Harmon S. Eberhard, president. In his new capacity, Mr. Woodley will continue to give administrative direction to the Company's Manufacturing Division. The Manufacturing Division includes the eight Caterpillar plants located in the United States at Peoria, Joliet, Decatur and Aurora, Ill.; San Leandro, California; Milwaukee, Wisconsin; York, Pennsylvania; and Davenport, Iowa. In addition, it includes the Company's Purchasing, Traffic and Manufacturing General Offices. Mr. Woodley joined Caterpillar in 1926 at the age of sixteen.

After completing a machine shop apprenticeship, he advanced through various factory jobs to his first supervisory position in 1934. He was named general factory manager at Peoria in 1950 and was promoted to Peoria Plant Manager in 1953. He was elected a vice president in October, 1954. He is a member of the Society of Automotive Engineers, past president of the Peoria Manufacturers Association, and a director of the Central National Bank of Peoria.

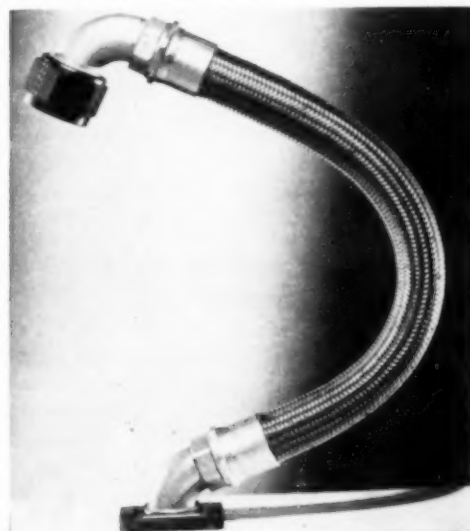
IH President



Frank W. Jenks

Frank W. Jenks, formerly executive vice president, International Harvester Company, was elected president of the Company, John L. McCaffrey, chairman of the board and chief executive officer, announced recently. Jenks succeeds Peter V. Moulder, who retired as president and who also resigned from the Board of Directors. Jenks, a native of Richmond, Virginia, began his Harvester career as a clerk in the Richmond sales office in 1914. After Army service in World War I, he returned to the Company and was appointed zone sales manager, later assistant district manager at Atlanta and acting district manager at Birmingham. He came to the General Office in Chicago in 1928, and in 1930 was appointed assistant regional sales manager. He became manager of the credit bureau in 1933, and in 1941 was appointed manager of the Credit and Collection Department. He was elected vice president, merchandising services, in 1944, and elected executive vice president in May, 1956. He has been a member of the Board of Directors since February 21, 1952. Jenks served as general chairman of The Community Fund of Chicago in 1946, and as president of the Illinois State Chamber of Commerce in 1948. He is a director of American Steel Foundries, trustee of Illinois Institute of Technology, of the Farm Foundation, and the Farm Film Foundation. He is also a member of the Citizens Board of the University of Chicago and of the Citizens Committee of the University of Illinois.

Preformed Teflon Hose



Introduction of preformed Teflon hose assemblies, designed to minimize design problems and save space and weight, has been announced by Stratoflex, Inc. Shaped to almost any configuration, under controlled heat, Stratoflex preformed Teflon minimizes design problems by allowing hose lines to clear obstructions and make connections with the shortest possible hose length. Temperature range and other performance characteristics are the same as standard straight Teflon. For more information write Stratoflex, Inc., Ft. Worth 14, Texas.

ITS NEW

JANUARY 1958

VAPOR PHASE® ELIMINATES NEED FOR GAS SCRUBBERS

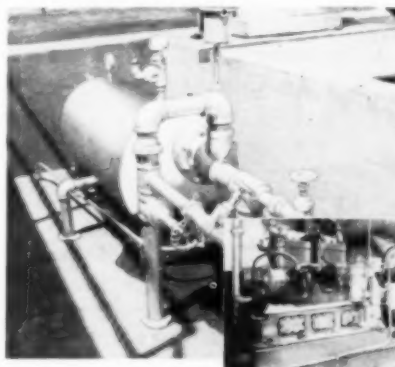
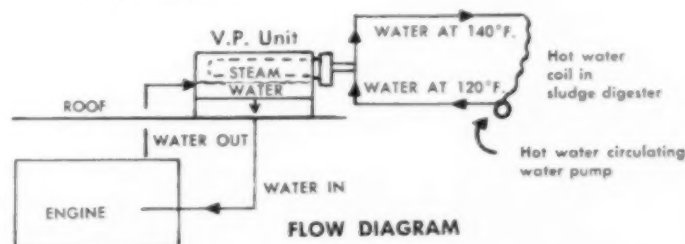
COMPLETE VAPOR PHASE® Heat Recovery and Cooling Systems Designed and Furnished by Engineering Controls



at San Bernardino Sewage Treatment Plant

Three engines (100 hp Enterprise, 160 hp Worthington, and 60 hp Buda) are operating at this treatment plant on 100% untreated sewage sludge gas.

Under normal operating conditions the H_2S gas content would be sufficient to stick piston rings in a few days. At the elevated Vapor Phase temperature (212°F.), however, acid cannot form — since the water jackets are always well above the dew point (194°F.).



Stream of water is pumped through set of coils in sludge digester to Vapor Phase unit which has tube bundle in steam dome. As water in secondary circuit flows through tube bundle it condenses steam, thus cooling engines and transferring jacket waste heat to sludge digesters.

Note the combination of the vapor phase separator and condenser, designed for use on the 60 hp Buda engine (inset). This engine has already operated for over 112,000 hrs. In this engine, as with the others in this installation, maintenance costs have been extremely low.



Sole Developers and Manufacturers of Vapor Phase® Thermal Circulation (Ebullition) Engine Cooling Systems.

ENGINEERING CONTROLS, Inc.

AN AFFILIATE OF ST. LOUIS SHIPBUILDING & STEEL CO.

611 E. Marceau
St. Louis 11, Mo.

1939 N. Hillhurst Ave.
Los Angeles 27, Calif.



AUTOMOTIVE DIESEL PROGRESS

A COMMENTARY BY MERRILL C. HORINE

Merrill C. Horine, for 38 years a member of the Society of Automotive Engineers, has been actively engaged in automotive engineering, sales promotion and training, advertising and editing of automotive publications since 1907. He has contributed numerous papers on diesel and allied subjects to the SAE and other organizations. An officer in the Air Service in World War I, he was a consultant to the Chief of Ordnance and the Automotive Division of the War Production Board in World War II.

Development Of Diesel Details - Part II

Protecting Head Gaskets

Cylinder head gaskets have never presented a simple problem to the developers of diesels and one of the most difficult puzzles was how to avoid edge-burning. Gaskets with double-thickness edges and great care in insuring that the asbestos filler left no voids behind the edge welts helped but were not a full solution. The difficulty was in the direct impingement of flame on the thin copper edge where it is exposed between the top of the liner and the head. A happy solution was found in the simple expedient of turning a lip on the inner edge of the liner in height only slightly less than the thickness of the gasket when compressed. This circumferential lip acts as a baffle to shield the gasket edge from the flame.

Angle-split Connecting Rods

Unquestionably the connecting-rod bearings are among the hardest-working parts on the diesel. In automotive practice it is essential that it be possible to withdraw pistons and connecting rods through the cylinders, as the general use of counterbalance weights and the generally crowded condition of the crankcase makes it impractical to pass them through the bottom. In conventional connecting rods, with the caps split at right angles to the axis of the rod and retained by side bolts, the diameter of the crankpin is therefore limited by the cylinder bore. To pass through the cylinder, the lower end of the rod must be sufficiently smaller across to provide reasonable clearance. When from this dimension is subtracted the thickness of the bolt bosses on the rod, plus a reasonable amount of metal between the bolts and the bearing bore and the thickness of the bearing shell itself, we have the maximum crankpin journal size. A crankpin diameter more than this would not only accommodate a bigger bearing, but would stiffen the shaft and provide more overlap between main and crankpin journal diameters. Several automotive diesels have successfully increased crankpin diameter in relation to cylinder bore by departing from conventional connecting rod construction and adopting a diagonally-split cap, using capscrews to hold the cap to the rod. More than one has also strengthened the union between cap and the rod by broaching the mating surfaces with

a tongue and groove, so that they are mutually supporting and the capscrews are relieved of all shear.

Lubricating Injection Mechanism

Traditionally, the lubrication of the high-precision parts of a diesel injection system is accomplished by the fuel itself and it is difficult to see how else it can be accomplished. However, there are mechanical adjuncts to injection pumps of all kinds which preferably should never come in contact with the fuel but which require lubrication. Unit injectors, located under the valve rocker covers and actuated by linkage from the camshaft are lubricated in common with the valve gear. Hydraulic nozzles, having no mechanical connection with the engine have no need for lubrication other than that supplied by the fuel. But the mechanically-driven pumps, whether operating at transfer or injection pressure, in-built governors, automatic timing devices and so on, do require lubrication with lubricating oil.

Heretofore, many of these pumps were simply provided with a base chamber into which a separate bath of oil was introduced up to a set level, the splash of the working parts being relied upon to distribute the oil. Inevitably a certain amount of internal leakage of fuel from the pump portions of the assembly found its way into this base chamber, diluting the oil within. This occasioned the necessity for periodic draining and refilling which, if neglected, could result in undue wear consequent to the drastic dilution of the oil. Lately injection pump applications have appeared in which oil is metered and fed to the base chamber from the main engine oil gallery and kept at a constant level by an overflow connection back to the engine sump. Dilution from fuel is avoided by a gland at the lower end of each plunger barrel connected with the fuel gallery. The difference in pressure existing results in all leakage past the plungers being drawn back into the fuel gallery, so that no contamination of the lube oil takes place.

Dirt and Air are Enemies

Dirt and air in the fuel are the twin enemies of the diesel engine. The first of these is the most

destructive, since it not only interferes with proper operation; but occasions costly repairs and renewals. Air in the fuel lines adversely affects injection, makes starting difficult and may immobilize the engine. Usually air enters the lines on the suction side of the system, due either to a low level of fuel in the tank or leaks in the connections somewhere along the line. Such air entrainment is almost impossible to prevent entirely. By a simple bleed connection at the top of the secondary fuel filter—that between the transfer pump and the injection pump—one manufacturer has provided for automatic venting off of any air which accumulates. Naturally any air drawn in and passed along by the transfer pump would be trapped in the filter dome. The connection has a 15-thousandths restriction, so that it does not lower the pressure of the fuel entering the injection pump gallery below that at which the pressure regulating valve is set. Connection is made from the air bleed line to the drip line leading back to the tank from the injection pump gallery regulating valve. In practice it has been found that with an accumulation of air in the system, the air will be purged in ten or fewer revolutions of the crankshaft.

Flange-mounted Compressor

Acceptance of the air compressor as an essential item of equipment on automotive diesels is now so complete that more and more engine designers are incorporating provisions for its mounting and drive in their basic designs. Instead of mounting the compressor on a base pedestal and driving it from the system of belts at the front end, several manufacturers now provide a flange mounting and a direct drive by shaft and coupling from the timing gears. Not only is this arrangement neater and more compact but it makes it practicable to provide water cooling and lubrication directly from the engine cooling and lubricating systems with connecting lines, if any, extremely short and well protected.

Although the future will undoubtedly bring forth many basic improvements in diesels for automotive use, some of which may even prove sensational, the refinement of details continues to contribute vitally to the success of the compression-ignition engine and to the progress of the industry.

Onan Marine Diesel Electric Plants



3,000 watt Onan marine diesel electric generating plant.

For 1958, D. W. Onan & Sons Inc., Minneapolis, Minnesota, will offer several new models of their diesel electric generating plants for the marine trade. A new version of their 3,000-watt marine diesel electric plant will feature the Onan exhibit at the National Motor Boat Show in January.

Powered by a single-cylinder, 4-cycle, Onan diesel, this unit is available in four standard voltages: 115-volt, 60-cycle; 115/230-volt, 60-cycle; combination 115-volt, 60-cycle and 32-volt dc (for battery charging); and straight 32-volt dc. Other standard voltages and 50-cycle current models available on special order. All units are equipped with remote starting. An air-cooled version of the above-mentioned plant will also be exhibited at the Show.

Equipped with Onan's new Vacu-Flo Cooling System this diesel generating set has been primarily designed for dependable operation below decks. This cooling system will provide adequate cooling for the engine-generator and an exceptionally large amount (equivalent of $\frac{1}{3}$ hp) of positive ventilation of the bilge, engine room or compartment in which the generator set is mounted. A third new Onan marine diesel generating plant, this one in the 10 kw size range, will make its debut at the January Show. A Hercules DD149, water-cooled, 3-cylinder diesel is the power source for this new model.

DEMA Elects Officers



Guy J. Coffey

Guy J. Coffey, President of Chicago Pneumatic Tool Company has been elected President of the Diesel Engine Manufacturers Association for the year 1958. Coffey, an association vice president and director, succeeded Walter A. Rentschler as President on January 1. Rentschler is Vice President and General Manager of the Hamilton Division of Baldwin-Lima-Hamilton Corporation, Hamilton, Ohio. Elected as Vice Presidents of the Association are William E. Butts, President, General Metals Corporation, San Francisco, California, and John N. MacKendrick, President, Clark Bros. Company, Olean, New York. Re-elected as Treas-

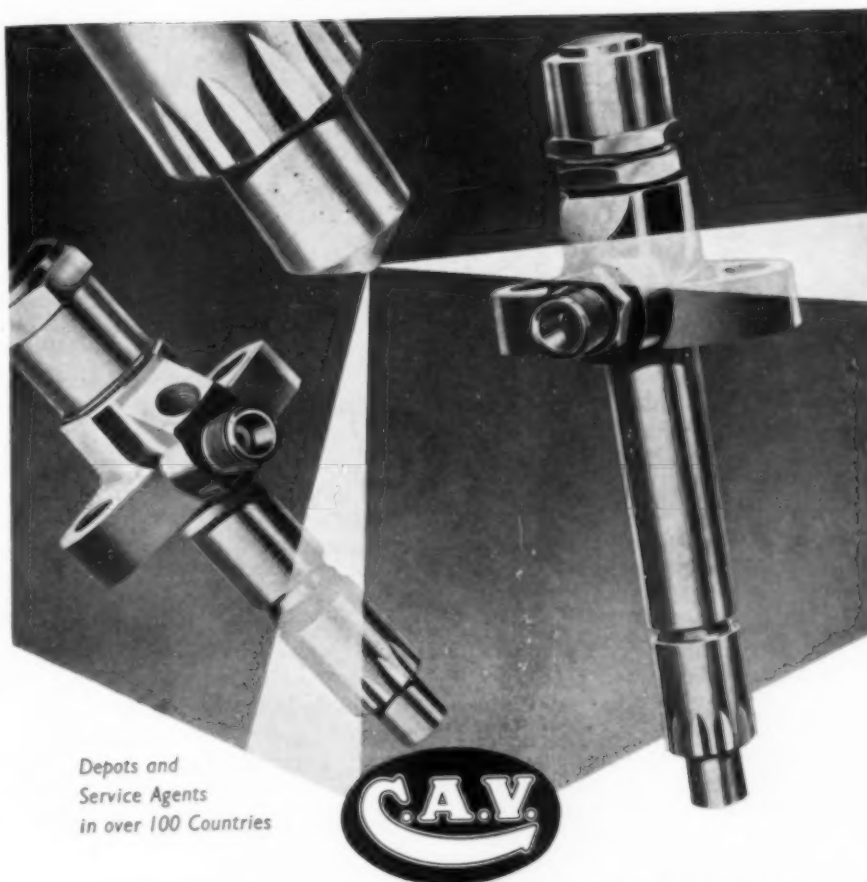
urer of the Association is Robert H. Morse, Jr., President, Fairbanks, Morse & Company, Chicago, Illinois, and re-elected as Executive Secretary is Robert L. Stanley of Falls Church, Virginia.

The following were elected as directors of the Association: William E. Butts, President, General Metals Corp.; Guy J. Coffey, President, Chicago Pneumatic Tool Co.; M. C. Davison, Vice President, Ingersoll-Rand Co.; Otto H. Fischer, President, The Union Diesel Engine Co.; Robert E. Friend, President, Nordberg Mfg. Co.; Thomas E. Hughes, General Manager, Cleveland Diesel Engine Div. of General Motors; John N. MacKendrick, President, Clark Bros. Co.; Eugene L. Miller, President, The Cooper Bessemer Corp.; Robert H. Morse, Jr., President, Fairbanks, Morse & Co.;

Walter A. Rentschler, Vice President and General Manager, Hamilton Div. of Baldwin-Lima-Hamilton Corp.; E. J. Schwanhauser, Vice-Chairman, Worthington Corp.

Guy Coffey, President of the Chicago Pneumatic Tool Company, joined Chicago Pneumatic in 1933 as a salesman assigned to the Philadelphia district. Six years later, in 1939, he took over the job of district manager in Los Angeles. In 1945 he was appointed Vice President in Charge of Sales, and served in that capacity until elected President of the Company in January of 1953. Mr. Coffey is also active as a Member of the Board of Directors of the First Bank & Trust Company of Utica and serves as an advisory member on the Board of The Chase Manhattan Bank in New York.

The World's Leading Manufacturers of FUEL INJECTION EQUIPMENT for Diesel Engines



Depots and
Service Agents
in over 100 Countries



FUEL INJECTION EQUIPMENT DIVISION

of

LUCAS ELECTRICAL SERVICES, INC.

Head Office: 653 Tenth Avenue, New York 36, New York

Sales Office: 14820 Detroit Avenue, Cleveland 7, Ohio

West Coast: 5025-29 W. Jefferson Blvd., Los Angeles 16, California

Canadian Distributors:

Joseph Lucas (Canada) Ltd., Head Office: 11 Davies Avenue, Toronto 8, Ontario

Branch Office: 3401 St. Antoine Street, Montreal 30, Que.

AP-474-619



GAS TURBINE PROGRESS

A COMMENTARY BY R. TOM SAWYER

R. Tom Sawyer's well known in the gas turbine field having been the first chairman (1944) (and now treasurer) of the Gas Turbine Power Division of ASME. He spent 7 years with G.E. Transportation Dept., and 26 years with American Locomotive, now Alco Products. At present he is a Consultant, including "Consultant to the Staff" of the Experimental Towing Tank at Stevens Institute of Technology. In addition to being a Fellow Member of ASME and AIEE, he is a member of SAE, ARS, ANS, IME in London, DEUA in London. He is also a member of Franklin Institute and a Professional Engineer. Mr. Sawyer is the author of *The Modern Gas Turbine* and *Gas Turbine Construction*, and co-author of *Applied Atomic Power*.

The Closed Cycle Gas Turbine Atomic Plant.

AS this type of power plant is now operating in Switzerland, France, Great Britain and Germany with either oil or coal fuel it was felt that the readers of DIESEL AND GAS TURBINE PROGRESS might want to become more familiar with the subject. In this country the interest in such a plant has centered around atomic fuel. From now on more and more data on the closed cycle gas turbine nuclear power plant will be coming from the U.S.A.E.C., the Army, the Maritime Commission and others actively investigating its possibilities. One of the most concise descriptions of a large plant is given in the original publication of the subject. This gives ample information and is surprisingly correct even to-day. The original publication is Chapter III of Part IV of the book *Applied Atomic Power* published in 1946. Actually Part IV was written by this writer over 12 years ago shortly after the bomb exploded over Hiroshima. The basic material for Chapter III was submitted by Dr. Curt Keller, Director of Research and Development, Escher Wyss Engineering Works, Zurich, Switzerland on December 31, 1945. The following is quoted directly from the original publication.

The Closed-Cycle gas turbine power plant using helium or helium mixtures appears to be one of the best systems for generating power by the use of the uranium pile. For this reason Dr. Keller, a world authority on closed-cycle systems, was asked to contribute the information embodied in this chapter. Helium is not affected by the radioactive

rays produced by a uranium pile, and for that reason helium or a helium mixture with carbon dioxide is ideal for use in a gas turbine plant requiring a uranium heater. Unlike combustion gas turbines, little has so far been reported about the gas turbine process employing a closed cycle. The first plant of this kind, an experimental installation of 2000 kw useful output, was completed in Switzerland during the summer of 1939 just before the outbreak of World War II. The enforced seclusion of Switzerland during the following 6 years, and more especially the interruption of communications with America, prevented scientists here and elsewhere from examining and discussing the new AK plant developed by the Escher Wyss Engineering Works in Zurich, according to proposals made by Akeret and Keller. However, in spite of the many difficulties arising from the war, the experimental plant was tried out. These trials represent the termination of the first phase of internal scientific development, and the results obtained have justified in both theoretical and practical expectations. Projects for power generation or ship propulsion embodying such closed-circuit plants, with air as the working medium, can now be realized without technical risks, on the basis of preliminary studies extending over a number of years. Some information, but not all data, has been provided in the preliminary Escher Wyss report which was read by this writer and discussed by S. A. Tucker during the June 1945 meeting of the American Society of Mechanical Engineers. After about 10 years of intensive development and re-

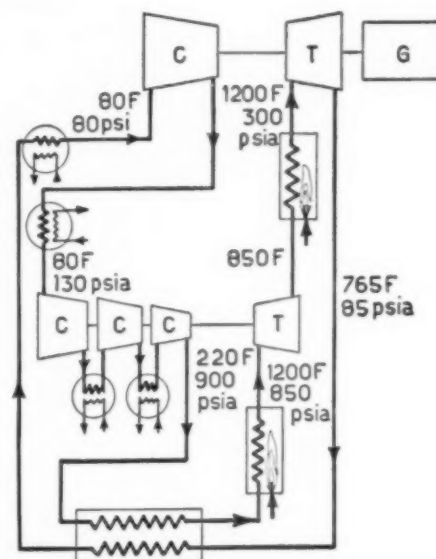


Figure 24. Diagram of air flow in power plant of Figure 20. T, turbine; C, compressor; G, generator. Flame shows location of Figure 27 or heater fired by normal fuel.

search, Escher Wyss believe they have realized a simple and highly efficient machine for stationary power plants.

Figure 20 illustrates how the machine part of a large size installation would now be built using oil, coal, or atomic energy for fuel. This is an example for a 35,000 hp plant with a main heater and a reheater unit. The low-pressure turbine is built together with that heat exchanger. Above the latter is the independent high-pressure set mounted on a framework. Large foundations or cellars, such as are used for steam turbine plants, are not required except possibly for the uranium pile. Figure 27 shows a sketch of a pile as it could be used with this plant. The dimensions shown on Figures 20 and 27 can be taken as approximate. Figure 24 illustrates the complete cycle. This system uses air within the closed cycle. If a helium mixture is used in this system, unusually high thermal efficiencies may be expected without having metals of unusual constructional material. By the use of

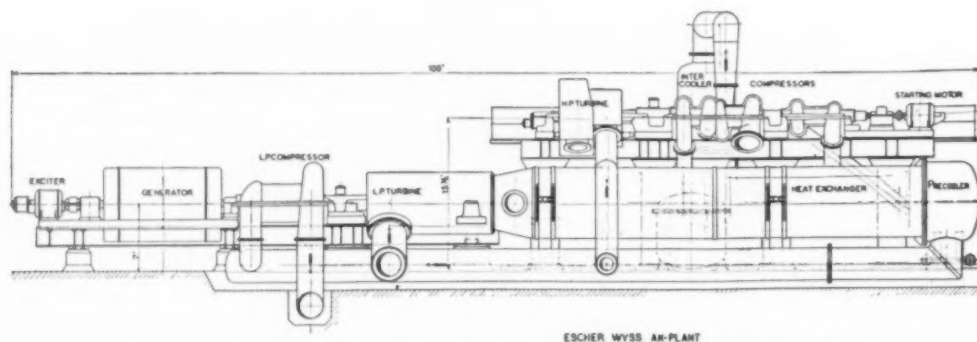


Figure 20. 35,000-Horsepower Escher Wyss AK Plant with Double Heating and Four Compressor Suitable for Atomic Power Use.

helium as the working medium, the heat-transmission coefficients in the heater tubes can become as large as with water without involving high-pressure losses. This fact is important as an indication that a gas turbine plant should be more efficient than a steam plant using water because the composition of water will vary, even depositing boiler scale. Helium or helium mixture would be a clean gas, giving the same blade efficiency after a long period of service as the gas did at the start.

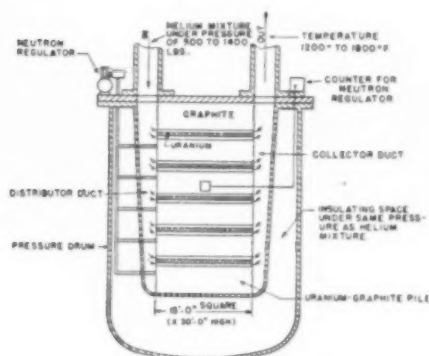


Figure 27. Construction of Uranium Heater

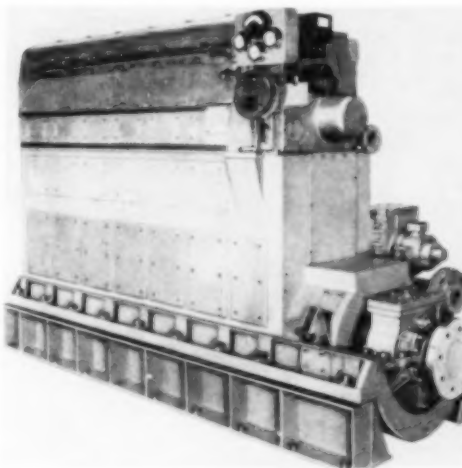
Even though helium does have the advantages of very high heat transmission coefficients, small relative pressure losses, and three times higher sound velocity than air, it has one serious disadvantage—it does cost money while air does not. For that reason helium can be used only in special cases, and an excellent special purpose is the use of atomic energy for creating heat.

As helium is neutral (indifferent) to radioactive parts and pile material, it can be let directly into a pressure casing that is in contact with the hot pile. Suitable canals can be provided to get enough heating surface, because the heat transfer with helium is very high at the elevated pressures (500 to 1400 psi). In this way, no special heater tubes are necessary, and the uranium bars are cooled directly by the helium. Let us regard the air-flow diagram of Figure 24 as a helium-mixture flow diagram. (The choice of suitable pressures and temperatures for the helium cycle depends mainly on the construction problems). The helium-mixture heaters, which come just before the turbines in the air-flow diagram, would be of the uranium type shown in Figure 27. The uranium heater under discussion is 15 ft square and 30 ft high. These figures are approximate because the size of the pile depends not only on the heat which can be given out to the helium but also on the still yet unknown physical conditions (temperatures) at which the pile can operate in stationary service. That the dimensions can be kept even smaller may be possible in the future. Four of these units should be sufficient to take care of the 35,000 hp plant of Figure 20. Two of these uranium heaters will be used to heat the helium before it enters the first (high-pressure) turbine; and two will be required to heat the helium before it enters the second turbine, the low-pressure unit. It is suggested that a spare unit be provided. A large overhead crane can be used to replace the discharged unit with the spare, which means the power generating plant can be located in one place. The uranium heaters can be removed as necessary and transported to another building which is capable of handling the uranium and graphite separately.

A total powerhouse capacity may be 200,000 hp or more. A capacity of 200,000 hp requires six generating plants of 35,000 hp each and 24 uranium heaters. For such large capacities (50,000 or 200,000 hp) single generating units could be built. By using closed-cycle machines, this will be possible. All uranium heaters would be taken by the same overhead crane into the chemical building where the contents could be properly handled. The uranium heater is so designed that the top is easily removed and the graphite and uranium readily taken out and replaced.

Tug Repowered

The tug *Alpena*, owned by Merritt-Chapman & Scott Corporation is being converted to diesel drive at the yards of the Sturgeon Bay Shipbuilding & Dry Dock Company at Sturgeon Bay, Wisconsin.

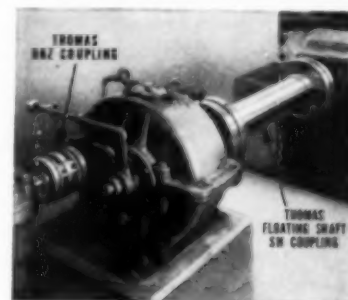


The main engine shown above is a Kahlenberg Model E diesel rated 750 hp at 375 rpm and 800 hp at 400 rpm and will be direct connected to the shafting. This is a turbocharged six cylinder two cycle diesel. A motor driven auxiliary blower is installed to supplement the turbocharger for maneuvering and slow running. The Kahlenberg Model E is an entirely self-sustained turbocharged two cycle diesel, which will start and operate at various speeds without the need of any assistance to the turbocharger of any kind. However, for some classes of service, such as harbor tugs and towboats, an assisting blower is advantageous for fastest reversing and acceleration. The auxiliary blower is, therefore, furnished in this tug installation and is used only when maneuvering. Further, in case of emergency, and should the turbocharger be out of commission, the engine will operate and develop up to 50 to 60% of power with the auxiliary blower in service.

The tug *Alpena* is an ex-steam tug 74 ft in length, and her conversion to diesel will greatly increase her horsepower and performance in service. GM 2-71, 20 kw auxiliary diesel generator sets are to be installed also. The main engine will be controlled from the pilot house by a mechanical system furnished by Kahlenberg with control head to both port and starboard sides of the pilot house for starting, stopping and reversing the main engine. Starting air pressure gauge and tachometer indicator and auxiliary blower control are also brought into the pilot house.

THOMAS FLEXIBLE COUPLINGS

Give You Freedom From Coupling Maintenance



NO LUBRICATION

NO MAINTENANCE

NO WEARING PARTS

Future maintenance costs and shutdowns are eliminated when you install Thomas Flexible Couplings. These all-metal couplings are open for inspection while running.

They will protect your equipment and extend the life of your machines.

Properly installed and operated within rated conditions, Thomas Flexible Couplings should last a lifetime.

UNDER LOAD and MISALIGNMENT ONLY THOMAS FLEXIBLE COUPLINGS OFFER ALL THESE ADVANTAGES.

- 1 Freedom from Backlash
Torsional Rigidity
- 2 Free End Float
- 3 Smooth Continuous Drive with
Constant Rotational Velocity
- 4 Visual Inspection While
in Operation
- 5 Original Balance for Life
- 6 No Lubrication
- 7 No Wearing Parts
- 8 No Maintenance

INDUSTRIAL COUPLINGS
Compressor Drives
Pump Drives

DIESEL ENGINE COUPLINGS
Main Drives
Auxiliary Drives

MARINE COUPLINGS
Main Drives
Auxiliary Drives

Write for Engineering Catalog 51-A

THOMAS FLEXIBLE COUPLING CO.

WARREN, PENNSYLVANIA, U. S. A.

Stainless Steel Towboat

St. Louis Shipbuilding and Steel Co. has built their first all welded stainless steel towboat hull.



Built for the United States Steel Corporation for use at their Clairton Works at Clairton, Pa., the USS-1 will see the most rugged service, handling coal barges around the landing. Some idea of its

job can be gleaned from the fact that as many as 35 barges are unloaded at this landing every day. All exposed surfaces of this tug below the main deck are stainless steel. This includes struts, propellers and double plated streamline rudders. The USS-1 has an overall length of 70 ft, a 20 ft molded beam, and an 8 ft 6 in. molded depth. Because of barge handling methods at the landing, this boat is unique, as are other tugs at Clairton, in that it has no towing knees and no deckhouse other than the engine room and a single room containing toilet facilities. Power for the USS-1 is obtained from a pair of Caterpillar D-375 Marine diesel engines developing 300 hp each at 1225 rpm. 3.92:1 reverse reduction gears are guaranteed to make 1000 reversals every 24 hours and are controlled from the pilot house, as are the main engines. Electric power is furnished by two 30 kw Caterpillar Model D311 diesel engines driving self regu-



lating constant voltage generators 3/60/120/208 volt ac with 4 wire leads. The Central Electric Mfg. Co. switchboard is provided with a double throw switch so that either generator may be thrown on the line, but not simultaneously.

Diesels Pay For Trucker

The Byers Transportation Company, Inc., of Kansas City, Mo., has found new efficiency of operation and a marked increase in fuel mileage since going diesel. Byers is a growing concern with a fleet of 36 road tractors, 76 trailers and city delivery units which include 29 tractors, 26 trucks and 16 trailers. The company principally handles both inter and intrastate traffic between Kansas City and St. Louis; Kansas City and St. Joseph; and St. Louis and St. Joseph, with an annual volume in excess of several million dollars. Among the modernization steps undertaken by this firm, which was founded in 1926, has been turning to diesels. The Byers Company has 21 Cummins JT-6-B engines in its fleet and "our thoughts are along the line of all diesel" said Jack Reitzes, Assistant to the President, Harry Byers. Byers has discontinued entirely gasoline powered over-the-road equipment, but is still operating a number of LPG powered units.

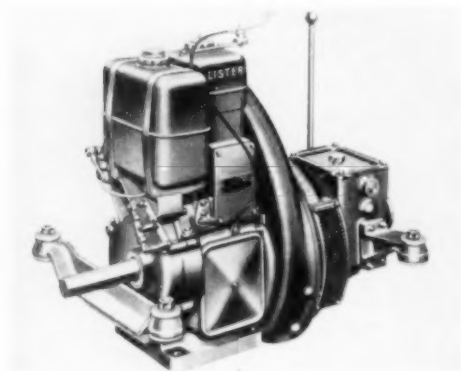


The Byers records show that the Cummins powered White '9000s' fuel cost per mile is 40% less than for the LPG powered trucks.

The Byers drivers like the power of diesel, and have been able to maintain steadier road speeds with the diesel-power equipment. The road fleet

runs approximately 2½ million miles per year. Byers transports "anything that can be hauled" with a well balanced operation between its points of service. The founder of the company was Harry Byers, who at the time constituted the company's entire employer-employee staff, operating between Kansas City and St. Joseph. The company was incorporated in 1934. Purchase of the B & H Truck Line, operating between Kansas City and St. Louis, was effected in 1936, and 2½ years later Byers bought out the Latta Truck Line between St. Louis and St. Joseph. A son, Paul, joined the company in 1947 and another son, Robert, became affiliated with the company in 1955. Byers is in the process of constructing a new terminal and general office facilities at 4200 Gardner, Kansas City, Mo. It is being built on a 5½ acre tract at a cost of \$400,000.00 and occupancy is set for this coming March 1.

Lister Boat Show Exhibit



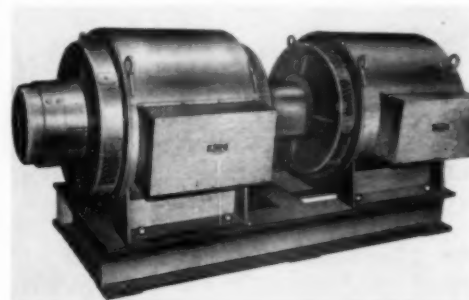
On view for the first time at last year's show were the Lister air-cooled diesel engines. Type LDM1 is a single cylinder model developing 3½ bhp at 1800 rpm and the twin cylinder type LDM2 develops 7 bhp at 1800 rpm. The decompressor arrangement and cold starting device permits easy hand starting at the lowest temperature. These will be shown again and, for the first time, as generator and pump auxiliaries. The Freedom Range up to

54 bhp will be represented by an FRM3GR, 3 cylinder propulsion unit, complete with gearbox and reduction gear. Developing 77 bhp at 1800 rpm and shown for the first time with an American gearbox, is the Rootes-Lister TSM3GR diesel engine, weighing only 1330 lbs and measuring only 27.3 in. in height. This engine is suited for propulsion of all types of craft, especially where conservation of space is an important factor. This is a 3 cylinder, direct injection, horizontally opposed piston, water-cooled, two stroke diesel engine with blower assisted scavenge.

High Voltage Motor-Generator Set

A new series of both high voltage motors and high voltage generators has been developed by Kato Engineering Company. Motors are available as large as 200 hp, 4160 volts at 1200 rpm. Generators are available as large as 300 kw, 4160 volts at 1200 rpm. The unit illustrated consists of a 200 hp high voltage motor of two bearing design driving a two bearing 125 kw low voltage 60 cycle alternator. The machines, on a common welded steel base are connected by a flexible coupling. Doll pins and pin holes are placed at four corners of both alter-

nator and motor base mountings which assures accurate alignment at all times. Alternators are available in either two bearing, single unit construction, or can be built in single or two bearing close coupled design for adaption to commercial engines. Kato manufactures a complete line of flexible couplings and bell housing adaptors which enables these alternators to be attached to any



appropriate engine with standard SAE bell housing. Motors are available only in two bearing single unit construction, but can be direct connected to a low voltage alternator or other equipment.

ITS NEW

DIESEL PROGRESS

DIESEL FUEL and LUBRICATION

BULLETIN

CITIES SERVICE

WHAT CAUSES LUBRICATION FAILURES?



The biggest single reason for lubrication failure is improper selection and application of lubricants.

Today's lubricating oils are made for highly specialized purposes. The fact that an oil seems ideal for the requirements of one piece of equipment is no guarantee of its qualifications for other machinery.

For example, choice of an oil with low detergency may result in stuck rings, excess cylinder wear, injector clogging, bearing wear and other diesel difficulties.

Next time you're considering what type of oil to use for a certain piece of equipment, call in a Cities Service Lubrication Engineer. He not only has the precise oil for the particular unit you want to lubricate, but may be able to simplify your entire lubrication picture and reduce maintenance costs as well.

USERS ACCLAIM CITIES SERVICE C-300 OIL

From a strip miner comes this report: "Shovel and dragline work 20 hrs. a day, seven days a week. Each have rolled up over 14,000 hrs. with no major overhaul, using Cities Service C-300 Motor Oil."

From a leading stone company: "Our six stationary diesels, powering our compressors and crushers, have averaged 12,000 hours each before major overhaul, with Cities Service C-300 Oil."

From a trucking company: "Our 20

diesels get up to 225,000 miles before overhaul with Cities Service C-300 Oil. We don't even grind the valves before then."

With excellent oxidation resistance, high detergency, and low carbon residue, Cities Service C-300 Oil may be the perfect lubricant for your machinery, too.

Get the facts from a Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.



USING A SULPHUROUS FUEL? TRY THIS NEW CITIES SERVICE OIL

If you're using a diesel fuel with high sulphur content, your motor oil must do more than its normal share of work to fight engine deposits.

Cities Service C-100 Motor Oil has been formulated for just this purpose. Under dusty, dirty, and sulphurous conditions, it provides excellent engine lubrication and protection. Talk with your Cities Service Lubrication Engineer for details.

MAN YOU SHOULD KNOW



Barney Fleming is the Regional Manager of Industrial Oil Sales at the Cities Service office in St. Paul, Minnesota. With a background of 35 years as a lubrication engineer and a talent for solving problems, he is typical of the Cities Service engineering staff that's at your service. A call to the nearest Cities Service office will bring a member of this staff to your plant or job site.

Mid-Continent Diesel News

By Jack F. Cozier

HALLIBURTON Oil Well Cementing Co., Duncan, Okla., bought a Cummins 335 hp NRTO-6-B diesel engine to power a Halliburton T-10 pump for oil field

service. The unit was sold through Cummins Sales & Service, Fort Worth, Tex.

FULLER-White Chevrolet Co., Tulsa, Okla., has purchased a matched pair of GM Detroit Diesel marine engines, 6123 T and 6122 T aluminum turbo-charged, 300 hp units, for powering a yacht. The sale was made through Diesel Power Co., Oklahoma City, Okla.

WOODROW Construction Co., Purcell, Okla., has bought an Oliver OC-12 crawler tractor with an angle dozer from Midwestern Engine & Equipment Co., Tulsa, Okla. The unit is powered with a Hercules diesel engine and will be used for local construction work.

FRIX & Brisch Co., Muskogee, Okla., has ordered a Hetherington & Berner asphalt

plant for highway construction from Tulsa Equipment Co., Inc., Tulsa, Okla. The unit will be powered by two GM diesel engines.

U. S. STEEL Corp., American Bridge Div., Pittsburgh, Penn., has received a Fairbanks, Morse six cylinder, 450 hp model 38F51/4 diesel engine generator set.

ROTARY Drilling Co., Tulsa, Okla., purchased a GM model 2031, 60 hp diesel engine from Diesel Power Co., Tulsa.

KERR McGee Oil Industries, Inc., Oklahoma City, Okla., purchased two Cat D375 NA oil field diesel engines for repowering a National 50 rig, from Hoover Equipment Co., Oklahoma City.

COZAD Construction Co., Sulphur, Okla., bought a Cummins model HBIS-600 diesel engine for powering a Le-Tourneau Westinghouse model C unit. The engine was sold by Cummins Sales & Service, Fort Worth, Tex.

BURGESS Construction Co., Tulsa, Okla., received a Euclid S18 scraper powered by a GM 6110 diesel engine from Butler Sparks Equipment Co., Tulsa. The unit will be used on construction work at the Amarillo Air Force base job in Texas.

CITY of Mullin, Neb., has purchased through R. W. Hughes Co., a Fairbanks, Morse model 38D81/2, 640 hp, four cylinder generating unit for the municipal light plant.

JULIAN Cohenour Construction Co., Ardmore, Okla., purchased a Cat D337 F diesel engine with a Cotta reduction gear for a Cedar Rapids rock crusher from Hoover Equipment Co., Oklahoma City, Okla.

SPENCER Drilling Co., Salem, Ill., has received two Cummins model HRFBI, 190 hp diesel engines from Cummins Missouri Diesel Sales Corp., St. Louis, Mo. The units will be used for oil field work.

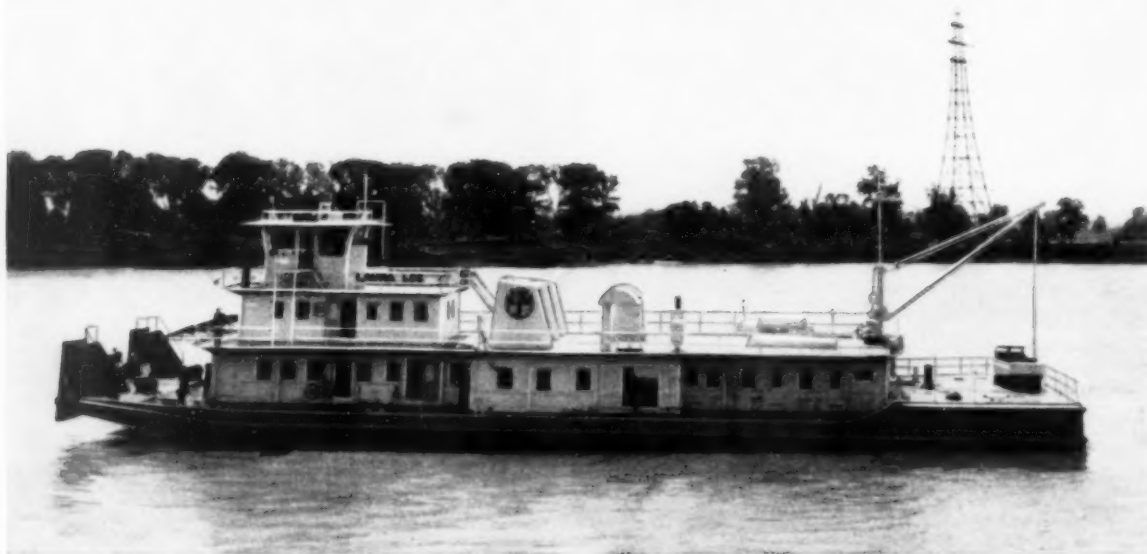
U. S. GYPSUM Co., Oklahoma City, Okla., has purchased a Euclid scraper, twin-powered with two GM diesel engines, one a model 6110 and another a model 671, for overburden removal in Western Oklahoma. The sale was made by Butler Sparks Equipment Co., Oklahoma City.

MIDWESTERN Drillers, Liberal, Kan., has purchased nine Cummins NHRS-6-BI, 320 hp diesel engines for application on Unit Rig & Equipment Co. equipment. The sale was made by Cummins Sales & Service, Inc., Fort Worth, Tex.

Where performance is the measure
F-M Diesels are the standard

Pushing for top tonnage

LAURA LEE... POWERED BY THREE 1600 HP.
FAIRBANKS-MORSE OPPOSED-PISTON MARINE DIESELS



M/V Laura Lee, newest pusher tow built by St. Louis Shipbuilding & Steel Co. for the Upper Mississippi Towing Corp. of Minneapolis.

With one of the largest thrusts on the river, the *Laura Lee* is designed and powered to push larger mixed tonnage tows from New Orleans over the entire Mississippi River system—faster.

Each of her three 102" screws is driven by a Fairbanks-Morse Marine Opposed-Piston Diesel, rated 1600 hp. at 720 rpm. Here is big power... responsive power, ideally suited to handle high-speed petroleum towing or the larger mixed tonnage tows of 20 to 30 barges.

Every day more river operators like the Upper Mississippi Towing Corporation are specifying

F-M marine O-P power for their fleets. In the face of rising labor and operating costs, they know the savings possible with O-P: more power... increased speed and maneuverability... proved economy and low maintenance.

Why not see what O-P performance can mean for the new construction or repowering you plan for the expanding future. See your nearby F-M Marine Specialist who will give you complete details on the Opposed-Piston diesel from 300 to 2400 hp. that ideally suits your needs. Fairbanks, Morse & Co., Dept. DP-1, Chicago 5, Ill.



FAIRBANKS-MORSE

a name worth remembering when you want the BEST

DIESEL AND DUAL FUEL ENGINES • DIESEL LOCOMOTIVES • RAIL CARS • ELECTRICAL MACHINERY • PUMPS • SCALES • HOME WATER SERVICE EQUIPMENT • MAGNETOS

STANDARD Industries, Stroud, Okla., purchased a model 33-E Koehring paver powered by a GM 471 diesel engine from the Clarence L. Boyd Co., Tulsa, Okla. The unit will be used for highway paving.

OFFSHORE Company, Baton Rouge, La., has bought through Continental-Emco Co., Dallas, Tex., two Cat D397 turbocharged 350 kw diesel electric sets with GE generators from Hoover Equipment Co., Oklahoma City, Okla.

VAPOR International Corp., Chicago, Ill., purchased fifteen Fairbanks, Morse model 45C41 $\frac{1}{2}$, 101 $\frac{1}{2}$ hp diesel generators.

DOLESE Brothers Co., Richards Spur, Okla., has repowered a model #6, 11 $\frac{1}{2}$ yd Northwest Shovel with a GM model 6031-C, 195 hp diesel engine with Cotta reduction gear from Diesel Power Co., Oklahoma City, Okla.

KERR-McGee Oil Industries, Inc., Oklahoma City, Okla., received two Cat D315 30 kw diesel electric sets in utility house with switchgear and distribution system from Hoover Equipment Co., Oklahoma City.

AMERICAN Bridge Div., of U. S. Steel Corp., Pittsburgh, Penn., purchased a Fairbanks, Morse model 48, 14 hp generating unit.

Truck Diesel Production

Truck fleet management and truck operators show a growing preference for diesels in heavy duty operations, reports C. R. Boll, Vice President-Sales, Cummins Engine Company, Inc. Boll cited shipment figures for the first nine months of 1957 showing that diesel increased to nearly 20 per cent of the total heavy duty truck (19,500 lbs and over) shipments. This compares with 18 per cent for the corresponding period in 1956. Factory shipments and percentages for the first nine months of 1956 and 1957 were as follows:

	1956 Shipments	Percent- age	1957 Shipments	Percent- age
Diesel	19,376	18.2	18,406	19.4
Gasoline	87,385	81.8	76,722	80.6
Total	106,761	100.0	95,128	100.0

A continuation in the trend to dieselization in heavy duty trucking is anticipated by Cummins and the Company plans to meet the growing needs with new models to maintain its share of the diesel market. Boll said total Cummins sales for the first nine months of 1957 were up more than 8 per cent over the corresponding period last year. He added that although the 1957 truck business was down from the record year of 1956, the drop in diesel purchases was only 5 per cent compared with 12 per

cent in the heavy duty gasoline truck field. Many truck manufacturers are turning to diesels to stabilize their share of the market, he said. The Cummins executive asserted that these factors were responsible for the increase in use of diesels: (1) Growing emphasis by fleet management on reduction in operating costs. (2) Need for higher horsepower engines, particularly in the Eastern and Central states. (3) Modern equipment designing which allows diesel engines to be placed in chassis comparable in size to the gasoline chassis.

The continuing preference for heavy duty trucks is foreseen in 1958 and Boll anticipates an increase of 5-6 per cent in the total heavy duty truck market for 1958.

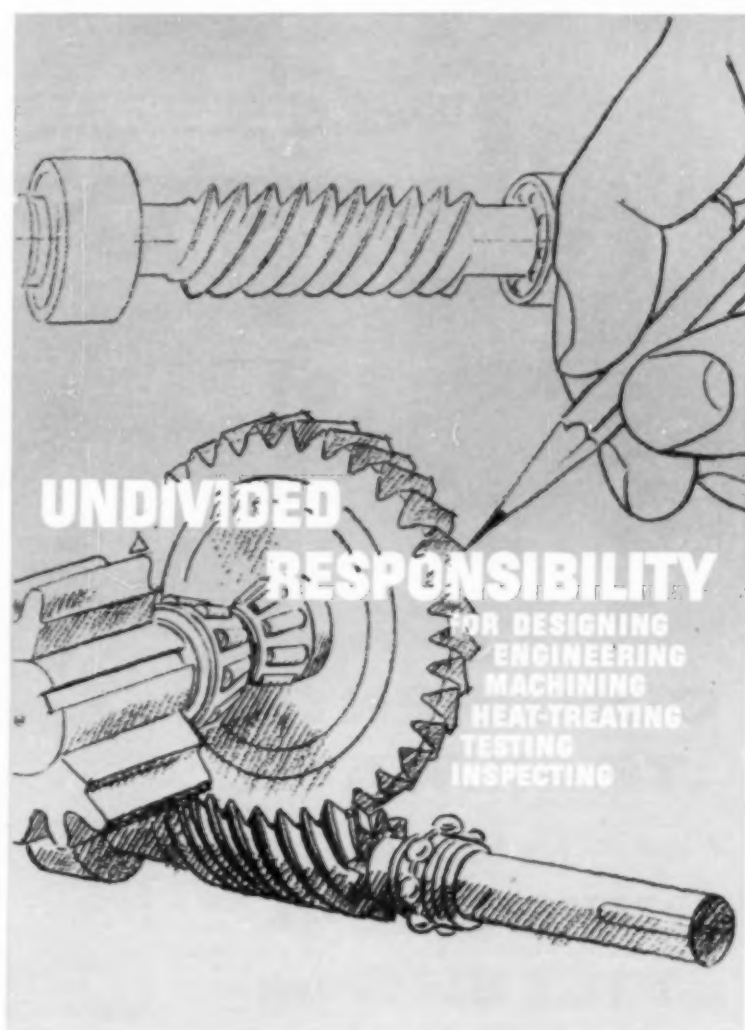
GM Boat Show Display

Featured by three new engines developed within the last year, Detroit Diesel Engine Division's display at the 1958 National Motor Boat Show points up the flexibility and wide power range of the GM Division's line of two-cycle diesels. On display for their first New York showing will be a 364 shp diesel for large pleasure craft; a 110 hp unit for small pleasure craft and a work boat model that attains one of the highest power-to-weight ratios in the entire Detroit Diesel line. The new turbopower engine is a six-cylinder 110 unit to which a single stage, free-turning, exhaust turbine has been added. The effect of the turbocharger is to improve combustion through better engine breathing and to add a substantial increase of 75 hp over the pleasure boat rating of the non-turbopowered unit.

The new 110 hp diesel on display is a three-cylinder Series 71 unit offered without heat exchanger and with a through-shaft direct drive marine gear as standard equipment. This model adds greater flexibility to the Detroit Diesel line as it provides an economical, light-weight diesel installation for small pleasure craft where heat exchangers are already installed and where lighter, more compact marine gears are practical. The new work boat model is a six-cylinder Series 71 unit. It is one of a series of newly developed E models in which up to 15 per cent more continuous horsepower is attained with no increase in fuel consumption. In these models the air intake ports in the cylinder liners have been enlarged and the number of exhaust valves per cylinder has been increased from two to four. Better engine breathing and better combustion is the result of these design improvements. Other models on display include the Division's 87 hp, valveless unit for small pleasure craft and work boats and vertical and inclined models for almost any

single-engine installation up to the 364 hp pleasure boat rating of the new 6-110. Several of these vertical and inclined models are displayed as matched pairs. Activated cutaway models are also on hand to demonstrate the two-cycle operation of all Detroit Diesel engines. Most of these engines will also be displayed at the International Boat Show in Miami in February.

NOW AVAILABLE! The Brand New **DIESEL ENGINE CATALOG**, Volume 22. This giant, 400 page, 10 $\frac{1}{2}$ " x 13 $\frac{1}{2}$ ", fully illustrated reference book containing complete and detailed engine and accessory sections is the biggest and best yet. Mail orders are now being filled for this "Bible of the Industry," which has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid plus California sales tax where applicable. Send checks or company orders to **DIESEL PROGRESS**, 816 N. La Cienega Blvd., Los Angeles 46, Calif.



BRAD FOOTE Gears will perform satisfactorily when used in your shop—or on equipment you sell to others—because BRAD FOOTE can unconditionally guarantee their quality.

Every manufacturing step from the inception of the original design to delivery of the finished gears—including heat-treating—is completely controlled—here—in our own plant.

No one shares our responsibility.

BRAD FOOTE makes any type of gear—out of any type of material. BRAD FOOTE makes speed reducers, transmissions and intricate power units. All are famous for long, satisfactory service.

Why not discuss your requirements with our engineering staff, let us make recommendations or quote on your specifications. It can cost you much more to settle for less than BRAD FOOTE quality and service.



subsidiaries

**BRAD FOOTE
GEAR WORKS, INC.**

1306 South Cicero Avenue • Cicero 50, Illinois
Bishop 2-1070 • Olympic 2-7700 • TWX: CIC-2856-U

AMERICAN GEAR & MFG. CO. PITTSBURGH GEAR COMPANY
Phone: Lemont 920 Phone: Spalding 1-4600
Lemont, Illinois Pittsburgh 25, Pennsylvania

Florida Diesel News

By Ed Dennis

THREE Fairbanks-Morse diesels, model 38D81 $\frac{1}{2}$, two cycle, 5 cyl, opposed piston, each rated 800 hp for pump station #7 of the Central & Southern Florida Flood Control Project. Located on the North New River Canal, 26 miles south of

South Bay, they will provide power for 3 Fairbanks-Morse horizontal axial flow, model 6310 pumps each with 131.5 dia impellers, capacity 830 cfs at 5.3 head each. Two 100 kw diesel generating units will also be installed.

AT BAHIA Mar Yacht Basin, the drift fishing vessel *Cap't. Bill* was repowered by Ellis Diesel Sales & Service with two

General Motors 6-71 diesel engines and 2:1 Twin Disc r&r gears. Also included was a 110 v 3 kw U.S. diesel generating set.

TWO Allis-Chalmers diesels were installed in the 40 ft yacht *Reverie* of Palm Beach. They are model 6 DAMR, each rated 70 hp at 1800 rpm through Snow-Nabstedt r&r gears; fuel consump-

tion dropped to about one third of the gasoline engine consumption. The engines were installed and engineered by the J. Frank Knorr Co. of Miami.

AT Winter Haven, the Eloise Groves had a model HR6P Cummins diesel engine, rated 175 hp, installed to supply power for a Lennan water pump, for irrigation purposes, from the Tampa office of Cummins Diesel Engines of Florida.

SHELLEY Tractor & Equipment Co., distributors of Caterpillar products, will open a Ft. Lauderdale branch for parts, sales and service in Broward County, in January. Located at 1800 N. W. 23rd Ave., Ft. Lauderdale, James Cunningham will serve as branch manager and Everett Allen as parts manager.

TWO Fairbanks-Morse diesel engines, each rated, 1800 hp, propel the twin screw *M. F. Ancol* owned by the Interland Shipping Co. Two General Motors 3268, 100 kw generator units take care of the auxiliary power needed. This vessel is to be used for freight and towing between Gulf and West Indian ports.

THE new Hatteras trawler *Miss Kim* has a 2 kw Lister-Blackstone diesel generating unit. The main diesel for this 55 footer, is a GM 6-71 with Twin Disc 4.5:1 r&r gears to drive the 44x34 Doran Alabama propeller. It will fish the Atlantic Ocean.

A Cummins diesel engine of about 500 hp was installed in the new #1500 Manitowoc dragline shipped from Miami to Moa Bay Mining Co. of Moa Bay, Cuba.

TWO Hercules diesels are on the 20x15 ft dredge at Auto Marine Engineers. Both are model DFNE rated 150 hp at 1200 rpm. One drives a 10x8 Maddox sand pump through a Capitol 2:1 r&r gear for an easy 150 yds an hour; the other drives a 60 kw generating unit.

AT MILTON, the Branch Erection Co., had a model NRT6BI Cummins 300 hp diesel engine installed in their Le Tourneau Westinghouse B172 scraper; Cummins Diesel Sales Inc. of Birmingham, Alabama made the sale.

THE Gibbs Corp., Jacksonville, launched a 70x20 ft tug. The main engine is a D397 Caterpillar with 500 con. hp at 1200 rpm and drives a 72 in. 3 blade propeller. The auxiliaries are two 20 kva, 110/208 v ac Caterpillar generating units.

AT Ft. Lauderdale, the 38 ft ketch *Voyager* was repowered with a model 636 Mercedes-Benz diesel rated 97 hp

WINSLOW Full-Flow FILTERS

Case History Report No. 38 Shows Why Engines
Protected by WINSLOW FILTERS Last Longer

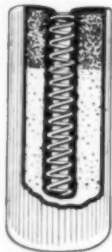


CONTINENTAL TRAILWAYS installs WINSLOW FILTERS on DIESEL BUSES

Following more than two years of exhaustive testing, Winslow full-flow Filters, Model 8-931-E, are installed on Cummins JT engines that power interstate buses for Continental Trailways.

As they have for many other major fleets, Winslow Filters reduce engine wear and lower maintenance costs for Continental Trailways. This modern full-flow filtration increases the useful life of lube oil and of filter elements, and protects engines under all conditions of service and temperature.

*CP is fully protected by patents and trademarks



CP* FILTRATION

Winslow patented CP* (Controlled Pressure) elements are designed to continuously self-adjust the pressure within the filter and allow for a full stream of filtered oil without opening by-pass valves. This is accomplished through the dual flow capacity, with two types of material in the same element.

WINSLOW

ENGINEERING & MANUFACTURING COMPANY
4069 Hollis Street, Oakland, California

W-2595-A

with Renk 2:1 r&r gears for auxiliary power.

AN International diesel engine was included in the TD14 crawler, with a Drott skid shovel attachment, for Chick Serienei of Hollywood; while a TD24 went to Bransfield & White of Ojus; all from Florida Georgia Tractor Co.

AT TAMPA. Kraft Foods, had a Cummins 180 hp model HRFB, diesel installed in a Diamond T hiway tractor while Rempak of Miami repowered their International COE tractor with a 200 hp Cummins diesel model NHB600; both had Fuller roadranger transmissions.

DIESEL Shipbuilding Co. at Jacksonville, installed two D378 Caterpillar diesels in the newly launched tug *William L.* to be operated by the Mill Division of Owens Illinois Glass Co. between Florida ports and the Bahama Islands. These 8 cyl turbocharged Cats are rated 378 hp each with 2.93:1 r&r gears. A 5 kw Onan diesel generating unit was also included.

A 1500 watt Petter diesel generator set was installed on the new 67 ft *Linda Charlene* for the Singleton Shrimp Co., Tampa. Main engine is a D 342 Cat with 3:1 Snow-Nahstedt r&r gears.

Prime Mover Control Conference

An international atmosphere prevailed in Rockford, Illinois, from September 3 to September 6 at the Woodward Governor plant. Men from Indonesia, Turkey, Nova Scotia, Canada and from the United States and speaking the universal tongue of the engineer met at the Twenty-First Prime Mover Control Conference held in Rockford. More than 225 technical representatives of the Indonesian Industry Division of Technology, Turkish State Railways, Nova Scotia Power Commission among our foreign friends, and such major industrial organizations as A C Spark Plug Div., Air Research Mfg. Co., Allis-Chalmers, Boeing Aircraft, Caterpillar Tractor, Civil Aeronautics Administration, Cooper-Bessemer Corp., Delta Airlines, Electro-Motive Div. of General Motors Corp., Fairbanks, Morse & Co., Illinois Central Railroad, International Harvester Co., Monsanto Chemical Co., Philco Corp., Socony Mobil Oil Co., Standard Oil Co., the U. S. Air Force, and many others were represented at this conference. They came to attend one of the largest sources of technical information on hydraulic governor theory, application, maintenance and operation in the world. It is open to all domestic and foreign industries using hydraulic governors in their own operations or as original equipment on their products,

and to all branches of the U. S. Government. Conferees were welcomed with an address by Irl Martin, President of Woodward Governor Co. on Tuesday morning, September 4. Following the welcoming address G. Forest Drake, Vice President in charge of Engineering opened the technical sessions by presenting the engineering fundamentals and basic principles of operation of prime mover governors.

Conferees were introduced to the complex maze of fly-weights, hydraulic valves and circuits, servo mechanisms, differential pressures, mechanical computers, load sensory devices, and combinations of these and many more elements devised by Woodward Governor Company to perform precise control of prime movers. While this may sound like engineering gobbledegook, it's really rather simple. In plain language it means that the hydraulic governor is built to maintain the desired speed of a prime mover (diesel, gas, dual-fuel or turbine) under varying conditions of load as determined by demand under varying conditions of pressure, suction, temperature, altitude, vehicle speed, etc. Such governors are required on ships, oil well drilling rigs, rock crushers, dredges, locomotives, electric generating plants, pipeline pumping stations, aircraft turbines (jets), pipeline pumping stations, chemical processing plants, sugar mills, petroleum catalytic cracking plants, aircraft propellers, hydro-electric power dams and in many other applications. The objectives of this conference were to acquaint all conferees with the fundamental, basic principles of governor design and operation . . . to introduce these conferee-engineers and technicians to the intricacies of Woodward Governors . . . to explain the maintenance and repair procedures which may be done successfully in the field . . . and those which require the special tools, equipment and techniques available only at the factory.

Trucks For Los Angeles-Seattle Motor Express

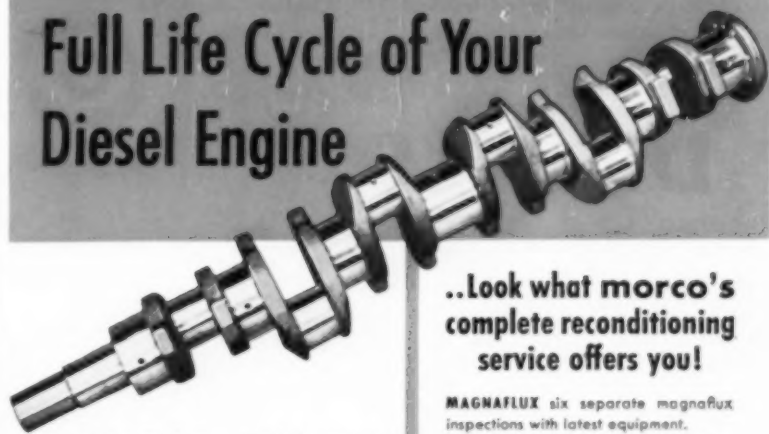
Sale of 18 new Kenworth trucks to Los Angeles-Seattle Motor Express is announced by Lewis T. Gerlach, general sales manager, Kenworth Motor Truck Company, Seattle. Additions to the LASME fleet include 15 model 521 Cab-Surrounding-Engine units and three Model 923 drop-frame front-end conventional units. The CSE Kenworths are powered with 210 horsepower Cummins NHB diesel engines and are equipped with engine exhaust brakes.

The new aerodynamically designed CSE cab has bulkhead-type doors and wide-vision, distortion-free windshield. These trucks are two-axle, single rear axle drive units. LA-Seattle's new Kenworth

Model 923's are three-axle, dual rear axle drive tractors also powered with 210 horsepower Cummins NHB diesel engines. Both models in the LASME order save weight through the use of aluminum for frame and cross members, frame cover plate, hubs, wheels, transmission housings, cab and sleeper cab. The 923's also have aluminum carrier housings. As common carriers, Los An-

geles-Seattle Motor Express divides its operations into three principle freight routes: Vancouver, B. C. to Seattle in a general freight operation under the name of British Columbia-Seattle Motor Express; Seattle to Los Angeles including the Bay Area; and Portland to Los Angeles by way of the Bay Area and other California points. LASME was founded in 1937.

morco Factory-Certified Exchange Crankshafts give Trouble-Free Operation for the Full Life Cycle of Your Diesel Engine



..Look what morco's complete reconditioning service offers you!

MAGNATLUX six separate magnaflux inspections with latest equipment.

GROUND on production type equipment to engine manufacturers' specifications. Original stroke retained.

TOCCO* HARDENED by the original equipment method when necessary.

ROLLED FILLETS increase strength at the most critical areas.

DYNAMIC BALANCE restored on original factory balancing equipment.

THRUST COLLARS and surfaces restored.

GEAR FITS renewed.

KEYWAYS restored.

DOWEL HOLES repaired.

OIL SEAL surfaces renewed.

THREADS repaired.

morco dealers—coast to coast—are stocked with reconditioned, like-new crankshafts for different diesel engine models. Users of Detroit Diesel and Cummins engines can exchange worn shafts for MORCO factory-reconditioned shafts through authorized dealers.

Why take chances? Let your dealer be your source for dependable, safe crankshaft regrinding. You get immediate service, guaranteed quality and terrific economy. Ask your dealer about MORCO today.

*TOCCO is a registered trademark of the Ohio Crankshaft Co.

morco INC.
BEDFORD, OHIO

a subsidiary of
The Ohio Crankshaft Company

New FREE Bulletin

Mail Coupon Today!



MORCO, Inc.—Dept. J
22201 Aurora Road, Bedford, Ohio
Please send free copy of "The MORCO Story":

Name

Company

Address

City Zone State

Gulf Coast Diesel

Notes

By Michael T. Pate

SHELL Oil Company, Deer Park, Texas, is powering a Johnson pump at its refinery with a Cummins model NRT 300 hp diesel, which was secured from Cummins Sales & Service, Inc., Fort Worth, Texas.

RIMROCK Tidelands Drilling Company, New Orleans, Louisiana, has purchased three Stewart & Stevenson General Motors diesel 6-110 quads, each unit rated at 920 hp. The units will power a 20,000 ft capacity drilling rig.

BURTON Miller Construction Company, Burns Flat, Oklahoma, has secured two model 6LRDBU Waukesha diesel 150 kw ac generator sets. Sale was made by Waukesha Sales & Service, Inc., of Houston, Texas.

CENAC Towing Company, Houma, Louisiana, is installing a VT-12-M Cummins diesel in a towboat. The engine was secured from Cummins Sales & Service, Inc., New Orleans, Louisiana, and is rated at 600 hp.

ST. JOSEPH'S Hospital, Fort Worth, Texas, has taken delivery of a 250 kw General Motors diesel driven ac generator set for emergency power. The sale was made by Stewart & Stevenson Services, Inc., Houston, Texas.

THE PORT of Houston, Texas, has bought two 6 cylinder, model 38F514 basic marine diesels, each rated at 525 hp. The diesels were sold by the diesel division, Fairbanks, Morse & Company.

BRASWELL Motor Freight Line, El Paso, Texas, has installed in an International Harvester DC-405 a model N HB Cummins diesel. The engine was sold by Cummins Rio Grande, El Paso, Texas.

GARDNER-Denver Company, Dallas, Texas, has taken delivery from Stewart & Stevenson Services, Inc., of Houston, of a model 12107 260 hp General Motors power unit. The diesel was delivered for use out of the Dallas district.

DIAMOND Alkali Company, Houston, Texas, has secured from Applied Power Equipment & Mfg. Company, of Houston, a model 6DA-273 Allis-Chalmers diesel which will be used to drive barge pumps. The diesel is rated 40 hp continuous service.

CONNER-Hyde Mining Company, Greenville, Alabama, has obtained from Cummins Diesel Sales, Inc., Birmingham, Alabama, a model HR-6-P Cummins diesel rated at 175 hp which will be used to furnish power in the company's mining operations.

U. S. ARMY, Corps of Engineers, Washington, D. C., has completed taking delivery of 454 Stewart & Stevenson 45 kw ac generator sets, each powered by a General Motors diesel. Delivery was made by Stewart & Stevenson Services, Inc., of Houston.

GULF Transportation Company, Houston, Texas, has bought a model 6DT-468 Allis-Chalmers 80 hp diesel for driving a cargo pump. Delivery was made by Applied Power Equipment & Mfg. Company, of Houston, Texas.

WOODWARD Iron Company, Birmingham, Alabama, is powering a crane with a model HRS-6-BI, 240 hp Cummins diesel. The engine was sold by Cummins Diesel Sales, Inc., of Birmingham, Alabama.

AUSTIN Road Company, Dallas, Texas, has bought from Stewart & Stevenson Services, Inc., Houston, Texas, a 400 kw generator set powered by a General Motors diesel unit.

TODD Shipyards Corporation, Houston, Texas, has obtained from Applied Power Equipment & Mfg. Company, Houston, a model 6DA-230 Allis-Chalmers diesel, rated at 40 hp continuous.

BROWN & Root, Inc., Houston, Texas, have taken delivery from Stewart & Stevenson Services, Inc., Houston, of a model 6-110 General Motors marine diesel which will be used in the company's Louisiana operations.

HERCULES Motors Corporation has moved its Houston, Texas, factory branch from former quarters at 6818 Navigation Boulevard to more roomy facilities at 5031 Gulf Freeway, within 3½ miles of downtown Houston. The enlarged quarters will permit handling larger stocks of Hercules diesels and

other power units, larger stocks of parts, and expanded engine rebuilding and repair. The Houston branch is under the supervision of James A. Embry, regional manager, with the Houston operations directly under David A. Otto, branch manager.

Executive Engineering Changes

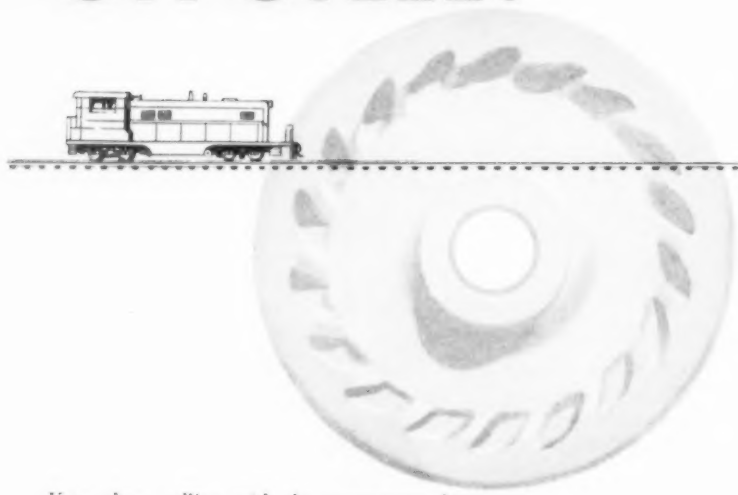
Walter M. May, vice president-engineering, Mack Trucks, Inc., has announced the appointment of two new executives and the promotion of two others in the company's engineering division. Allen H. Glasenapp has joined the Mack organization as executive assistant to the vice president-engineering, and Irvin G. Detra has been retained as executive engineer in charge of the gear design department. Winton J. Pelizzoni has been promoted to assistant executive engineer, as aide to Bruno Loeffler, executive engineer in charge of the engine design department. Donald L. Manning, a bus engineer, has been named executive engineer of the bus design department at Mack's Sidney, O., division.

Mr. Glasenapp previously served as chief engineer of the diesel engine section of the International Harvester Company's construction equipment division. Prior to his employment by International Harvester in 1950, he was section head engineer for the General Motors Corporation's Cleveland diesel engine division. He holds a Masters degree in mechanical engineering from Case Institute of Technology. Mr. Detra was chief design engineer-automotive transmissions for the New Process Gear Corporation before joining Mack. He is a graduate of the University of Iowa. Mr. Pelizzoni, a graduate of Lehigh University, has been with Mack since 1934, serving in several executive posts in the engineering division. Prior to his present appointment, he was manager of Mack's testing laboratory at Plainfield, N.J. Mr. Manning served as general engineer for the former C. D. Beck and Co., manufacturer of cross-country buses, before its acquisition by Mack last year, and continued in that capacity until his present appointment.

Minneapolis-Moline President

Mr. J. Russell Duncan, of Chicago, was elected President and Chief Executive Officer of Minneapolis-Moline Company at a meeting of the Board of Directors in Chicago on November 15, according to an announcement by Mr. E. S. Reddig, Chairman of the Board. Mr. Duncan was also elected to the Board of Directors. The resignation of Mr. Henry S. Reddig, President and Director, was accepted with regret. During Mr. Reddig's tenure as President in 1957 major reorganization of manufacturing opera-

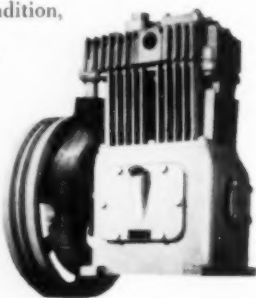
DIESELS ON STEEL?



Keep them rolling with the compressor famous for long-haul dependability. More than one hundred Quincy Authorized Service Depots throughout the country carry adequate stocks of parts for keeping any Quincy compressor in top condition, too. Models for every need to 90 C.F.M.

WRITE FOR CATALOG TODAY

Quincy
COMPRESSORS



QUINCY COMPRESSOR CO. • Dept. DP-158, QUINCY, ILL.

tions and strengthening of the sales and dealer organization have been accomplished so that he feels free to relinquish his position and devote his full time to his personal manufacturing interests in Ohio. Mr. Duncan was formerly Vice-President of Consolidated Foundries and Mfg. Corp. and has had extensive industrial experience. In 1947, at the request of the United States State Department, he served as head of the Capital Goods Section of the E.C.A. Mission to Italy under Mr. David Zellerbach. On this assignment, Mr. Duncan was engaged in planning the rehabilitation of the Italian automotive and steel industries. Mr. Duncan is 40 years old and is a native of Tucson, Arizona.

You Are Invited To The OGP Meeting

This is an invitation to exhibit and/or participate in the 30th Annual Conference and Exhibit of the Oil and Gas Power Division of ASME, to be held at the Bellevue-Stratford Hotel in Philadelphia, Pennsylvania, May 12 through 15, 1958. Technical sessions on latest engine and auxiliary component developments, along with timely engineering topics, will be presented. The impact of the OGP Conference and Exhibit attracts and influences among the following: Engine manufacturers, Oil Companies, Bureau of Ships, Chemical Companies, Pipeline Operators, Educators, Technical Publications, Consulting Engineers, Railroad Mechanical Officers, Army, Navy, Air Corps, Marines engineering personnel, Earthmoving Equipment Manufacturers, Engine Accessory Manufacturers, Municipal and Utility Power Operators, Marine Operators, Foreign Engine Manufacturers, and Instrument Manufacturers.

Early applicants for exhibit space will receive first consideration for choice locations. Orders will be acknowledged as received. Last year at Louisville booth space was a sell-out, creating disappointment for late applicants. Mail your exhibit space order now!

New Engine Installations

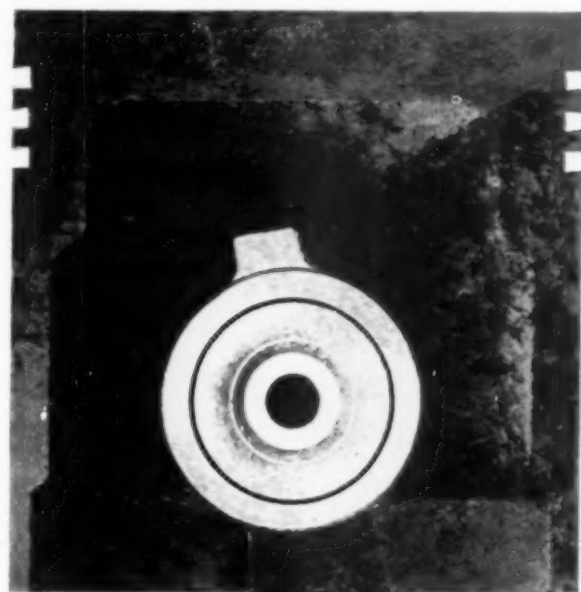
A two-cycle Nordberg Duafuel engine, rated 3450 hp, will be installed in the City of Robstown, Texas Utility Plant early next year. The 21½ in. bore engine has seven cylinders and operates at 240 rpm. Its attached Electric Machinery generator will have a net rating of 2450 kw. The new Nordberg will bring the installed capacity of this municipal plant to 11,890 hp, an increase of more than 35 percent over present capacity.

Nordberg Manufacturing Company also announces the receipt of a contract from

the City of Osborne, Kansas for a 1600 hp Duafuel engine. The four-cycle engine will have eight cylinders of 13 in. bore and will operate at 450 rpm. Installation of the Supairthermal engine is scheduled for June 1958. Nordberg's St. Louis plant will build the in-line type engine and Elliott Company is manufacturing the 1135 net kw generator. Present installed net capacity of

the plant is 1890 kw. The new engine is the fifth diesel-generator unit to be manufactured at Nordberg's Busch-Sulzer Division plant for the City of Osborne during the past 36 years. The first engine, purchased in 1921 and the second unit were replaced as the municipality's electrical load steadily increased. The two largest units produce a major share of the present requirements.

NOW AVAILABLE! The Brand New **DIESEL ENGINE CATALOG**, Volume 22. This giant, 400 page, 10½" x 13½", fully illustrated reference book containing complete and detailed engine and accessory sections is the biggest and best yet. Mail orders are now being filled for this "Bible of the Industry," which has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid plus California sales tax where applicable. Send checks or company orders to **DIESEL PROGRESS**, 816 N. La Cienega Blvd., Los Angeles 46, Cal.



Untuned damper
Simple design
Longer life
Extensively tested
Completely proved
Widely adapted

up-rate horsepower

Houdaille torsional vibration damper

Don't let torsionals restrict your engine design! Get the horsepower you want . . . without increasing engine size or crankshaft redesign. Use Houdaille Viscous Rotary Dampers. These compact untuned dampers offer the only truly effective way of minimizing torsional vibration across the full range of engine criticals.

The shearing action of highly viscous fluid, used exclusively makes it unequalled in performance. Precision design assures long, trouble-free life. There are no rubber parts to deteriorate from heat or grease.

Typical applications include: Hydraulic servo loop system stabilization. Rotational transient stabilization. Crankshaft and camshaft torsional vibration damping.

Now available in a wide range of sizes from 1½" to 34" in diameter . . . to meet every requirement. Houdaille engineers are at your service in solving vibration damping problem.

Range of Damper Specifications:

O.D. Inches	THICKNESS Inches	FLY WHEEL INERTIA Lb. In. Sec. ²	HOUSING INERTIA Lb. In. Sec. ²	DAMPING CONSTANT In. Lb./ Rad. Sec.
1.625	0.750	.00023	.00003	.002
34.031	5.875	330,000	138,000	58,000

FREE TECHNICAL BULLETIN gives complete engineering and performance data. For your copy write:

Specialists in vibration control and hydraulic applications



Houdaille Industries inc.

BUFFALO HYDRAULICS DIV. • 537 E. Delavan Ave., Buffalo 11, N. Y.

Inland River Reports

By A. D. Burroughs

RIVER rambling at this season encounters all sorts of weather and water as we view the new diesel beauties and review the old favorites.

THE most powerful new inland river vessel seen this month is the 4200 hp twin-screw *Valley Voyager*. Built by Dravo, the 200 ft MVBL towboat receives propulsion power from two 12-cylinder Nordberg engines.

SUPERIOR engines supply the rated 520 hp for the Chicago Towing Company's new single-screw tug-towboat, *Harbor King*, recently completed at the Sturgeon Bay Shipbuilding and Dry Dock Co.

STURGEON Bay Shipbuilding Co. has the order for the twin-screw 1000 hp towboat, *Harbor Queen*, also for Chicago Towing Co. The proposed royal flush in boat captions is near fulfillment as *The King* joins the now active *Harbor Jack* (the former *Eunice M*), and the *Queen* comes up for near-future construction. *Harbor Ten* is expected to tag the next fleet addition for this company.

OTHER activity at Sturgeon Bay (Wis.) included the repowering of Lea River Lines *Marjelea* with a trio of Enterprise DMG-39 engines, boosting main engine power to 2475 hp, and initiating the plans for the vessel's new name, appropriately enough, *Triple Power*.

WISCONSIN'S C. Reiss Coal Company gave the nod to Kahlenberg for the propulsion power on the firm's first diesel-powered craft. The vessel, scheduled for construction at Manitowoc Shipbuilding Co., will carry a turbocharged Model E Kahlenberg engine for her 700 hp.

THE NEW Orleans lumber firm, Robinson Lumber, reports profitable performance using the diesel-powered *Martha Ann*, a tiny powerhouse towboat pushing logs to lumber mills with power supplied by two Murphy engines.

MARINE Welding and Repair Co., Greenville, Miss., completed the 100 x 30 ft towboat for the Carroll Towing Company. Named the *William H. Craig*, the 1800 hp is delivered by two 567 G-M engines.

COMMERCIAL Transport Corp., Houston, took delivery of their newest fleet addition, just completed at New Orleans. Built by the American Marine Corp., the craft is named the *William Travis*, 132 by 34 ft, with a rated 2400 hp, and is an exact duplicate of the

Stephen Austin, and *James Bowie*; all are equipped with GM (Cleveland) engines.

THE *Walter Williamson* was covering considerable areas of inland rivers, but we spotted the new craft on the Ohio at work for owners, Greenville Towing Co., with power supplied by Cummins engines for the rated 2400 hp.

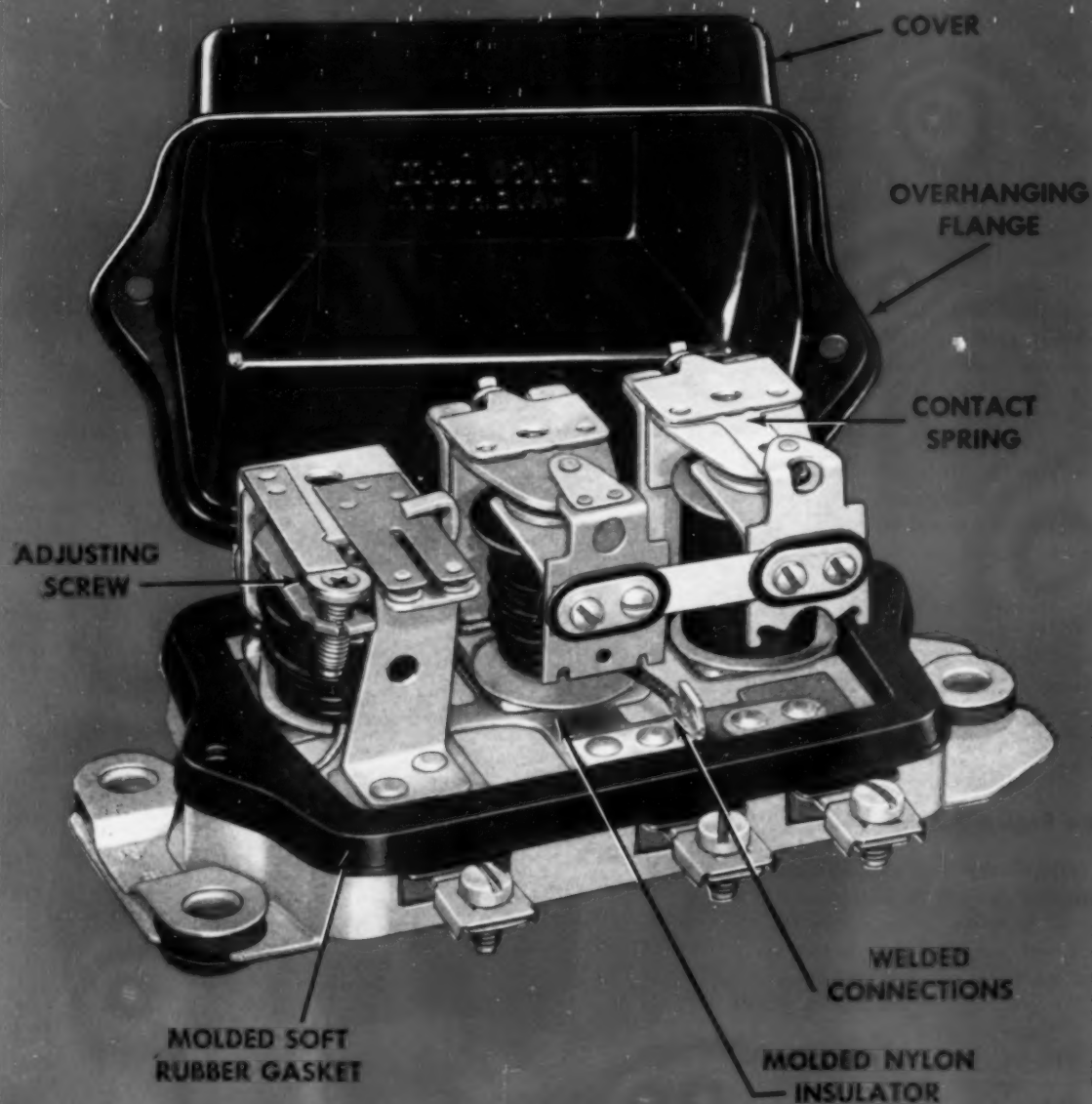
AT Southern yards, the Barbour Metal Boat Works delivered the newest Material Service Corp. fleet addition, the *Ida Crown*. The 70 x 21 ft towboat has 450 hp supplied from a duo of G-M 6-110's.

VEST Towing Co., Miss., newest fleet addition, the 100 by 35 ft *Bonnie D.*, received verbal applause with the per-

formance of upstream push-power ably delivered from a trio of 550 hp Caterpillar engines.

ARROWHEAD, active in the coal trade, was heading upstream on the Mississippi River, with heavily laden barges, with the reliable push-power coming from the twin turbocharged Cooper-Bessemer JS engines, each rated at 1240 bhp, pro-

PROGRESSIVE ENGINEERING MAKES THE DIFFERENCE



viding profitable service for Midwest Towing Company.

TWO Enterprise DMG 36 engines convert the old steamer, *J. S. Lewis* to new service as a diesel towboat for owner Amherst Barge Co., W. Va. The 26-year-old vessel, 155 ft in length, has known river duty as the *Vesta*, *James A. Rankin*, *Mike Creditor*, and *ORCO*.

THE *Nancy Jane* is back in service for owners, Campbell Barge Lines. A 1954 production from Dravo, the craft was in for propeller repairs at Neville Island, and was, in short time, back at work with power from the Atlas Model 35 engine.

FAIRBANKS-Morse engines provided the rated 3200 hp for the *Harriet Ann*,

as the powerful beauty made good time upstream with a good size tow under control for owners, Upper Mississippi Towing Corp., on the Mississippi River.

Engine Mfg. Co. Purchased

The Waukesha Motor Company of Waukesha, Wisconsin has announced its outright purchase of the complete plant

and assets of the Climax Engine Manufacturing Company of Clinton, Iowa, manufacturers of internal combustion engines. The purchase price was not disclosed. The addition of the Climax line of gas engines ranging up to 600 hp, will enable Waukesha to offer engines for services requiring power capacities intermediate between the ratings of many of its existing models. As a result, Waukesha will have complete coverage in a power range up to approximately 1200 hp. An important Climax product is a single-cylinder horizontal engine, produced in three sizes. Used largely for oil well pumping, on natural gas fuel, it has accounted for a large share of the company's sales in recent years. The other principal Climax products are V-type and in-line vertical engines of four, six, eight, and twelve-cylinder sizes. Fundamentally, they are used in the areas of the oil industry where natural gas is available at low cost, for drilling, well and pipeline pumping, and compressor operation. They are also sold for cotton ginning, irrigation, and municipal water and sewage plants.

Engine Bulletin

Nordberg's line of four-cycle Diesel, Dualfuel and spark ignition gas engines are thoroughly described in a newly published 16-page bulletin, No. 257. The engines are built as supercharged; supercharged and intercooled; and Supairthermal units. The in-line engines are built with either six or eight cylinders and range from 640 to 2150 hp. Separate data sheets give horsepower ratings, outline drawings of the engines, and all dimensions which are required for preliminary planning. The Supairthermal system which gives Nordberg engines higher horsepower output without increasing peak temperatures is explained and a schematic diagram illustrates the Supairthermal cycle of operation. Photographs and an annotated cross-section view through a power cylinder clearly show the basic design and construction features of the Nordberg Supairthermal engine's bedplate, main frame, cylinder parts, pistons and valve lever assembly. The various applications of these four-cycle engines are shown by numerous photographs of recent installations throughout the world. Bulletins are available free upon request to Nordberg Manufacturing Company or any of its District Offices.

ITS NEW

Your fuel consumption is 0.36 lb/hp/hr, no repairs for the past year, lube oil runs 10,000 hp/hrs per gallon, cost of generating power is 4 mills per kw and the purchasing agent asks, "But couldn't you have washed the wiping rags instead of sending them to the rag laundry?"

DELCO-REMY WATERPROOF STANDARD REGULATORS IMPROVE FLEET PERFORMANCE

Better electrical performance and greater dependability in any weather are important benefits to fleet operators found in Delco-Remy's waterproof standard generator regulators, now available for general replacement use.

And here are the features that make them the *right* regulators for Delco-Remy equipped cars and trucks in fleet operations.

- 1 New overhanging one-piece formed-steel cover and mating base shed road splash . . . convenient attaching screws are *outside* the enclosed area. Molded soft rubber gasket seals out harmful oil and water vapors.
- 2 Integral sleeves of molded nylon insulator form permanent seal around rivets—assure watertight base.
- 3 New, longer, more flexible armature contact spring on voltage regulator unit assures more positive closing of contact points for smoother operation.
- 4 Welded electrical connections, and highest quality tungsten and non-tarnishing precious metal contact points, assure minimum resistance, maximum durability.
- 5 Special fine thread screw-type controls allow easy, highly accurate adjustment of all three units.

Always replace with Delco-Remy waterproof regulators when you service Delco-Remy equipped cars and trucks. These improved regulators, built to highest quality standards by the original equipment manufacturer, are available from your car or truck dealer or the United Motors System.

DELCO-REMY • DIVISION OF GENERAL MOTORS • ANDERSON, INDIANA



GENERAL MOTORS LEADS THE WAY—STARTING WITH

Delco-Remy

ELECTRICAL SYSTEMS

Truck Fleet Modernization



The ET&WNC Transportation Company of Johnson City, Tennessee, announces the improvement and modernization of its fleet with the purchase of 20 new White 9000 tractors powered by Cummins JT-6-B diesel engines. ET&WNC Transportation System operates in eight southeastern states and in 1956 handled over 750,000 shipments aggregating more than 700 million lbs. Purchase of the 20 Cummins-powered units makes one quarter of the ET&WNC fleet diesel engine powered. Mr. C. M. Speer, general purchasing agent for the Company, said the Company's decision to add to its diesel fleet was based on: (1) greater fuel mileage with diesel-operated units (2) the diesels' ability to "take the hills faster" and (3) the greater period between engine overhauls. ET&WNC's purchase of 20 additional Cummins-powered White 9000's followed the performance of 30 Cummins JT-6-B units which were purchased and put into service between October of 1955 and December of 1956. The ET&WNC fleet totals 192 tractors, 343 trailers and 130 pickup units. In 1956 the Company's units covered 6,781,000 miles plus 2,500,000 miles

run by its division in Memphis, Inter City Trucking Company. Its lines extend from Raleigh, North Carolina and Columbia, South Carolina on the east to Little Rock, Arkansas and Memphis, Tennessee on the west. It serves points in Tennessee, North Carolina, South Carolina, Georgia, Arkansas, Alabama, Mississippi and Virginia.

Elevated To Sales Manager



George W. Edick

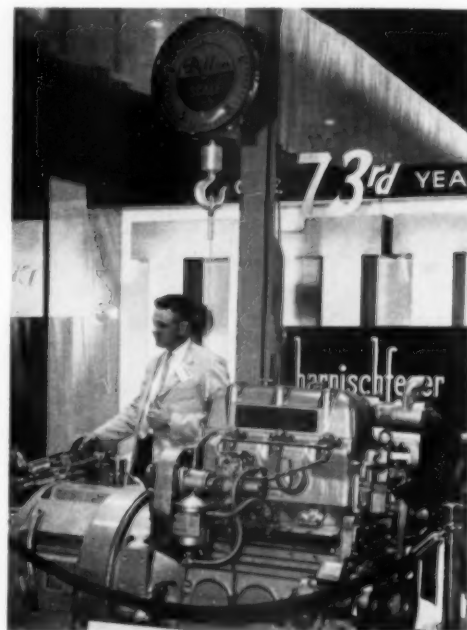
The elevation of George W. Edick to the position of Sales Manager, Domestic Division, has been announced by Grant C. Woodard, General Sales Manager of the Cooper-Bessemer Corporation. In his new capacity, Mr. Edick will be responsible for representing to the

management of Cooper-Bessemer all matters pertaining to branch office operations including sales of engine and compressor equipment, warehousing and servicing. He will also be responsible for coordinating sales activities under the immediate direction of Mr. Woodard. A graduate from Case Institute of Technology, Mr. Edick holds a degree of Bachelor of Science in Mechanical Engineering.

First associated with Westinghouse Corporation, Mr. Edick later joined Cooper-Bessemer and became head of the compressor engineering section. Prior to this newest assignment, Mr. Edick was Manager of Cooper-Bessemer's New York Branch Office. In this capacity he had charge of compres-

sor and stationary engine application and domestic sales in the New York territory.

Lightweight Generator Set

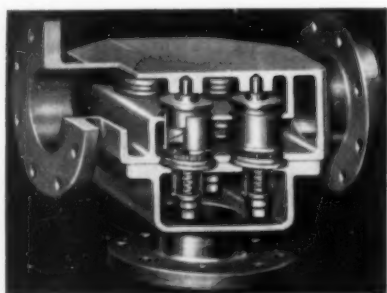


At the recent Air Force Powerama Show held in Washington, D.C., the P&H Diesel Engine Division of the Harnischfeger Corporation, Crystal Lake, Illinois, created a decided stir with an unusual and effective display of their new lightweight P&H Diesel and Generator Combination. To demonstrate the weight reduction of this new product, Harnischfeger engineers turned to Dillon Suspension Scale feeling that this would prove better than words that their new unit was all that they claimed for it. As shown in the illustration, the entire Engine-Generator Combination was suspended from a 5,000 lb capacity Dillon Scale, which graphically illustrates that this equipment is well within Government specifications for the total weight limit covering 60 kw operating at 1800 rpm.

Motorboat Show Exhibit



Allis-Chalmers Manufacturing Co., Milwaukee, Wis., is displaying its six-cylinder Model 6DAMR-273 lightweight marine diesel engine in Exhibit Space No. B-19 during the National Boat Show in New York City, January 17-26. The unit is ideal for powering all types of pleasure craft in the 22 to 60 ft length range. The engine, weighing under 1,000 lbs, complete with marine gear, delivers 85 useable shaft hp at 2800 rpm. It has a 3 3/4 in. bore, 4 1/8 in. stroke and a 273 cu in. piston displacement. Literature covering Allis-Chalmers Marine engines, generator sets, and similar equipment will be distributed during the show at the company's display area.



● BE SURE WITH AMOT JACKET WATER & LUBE OIL THERMOSTATS

SAFETY Provided for by multiple independent elements as shown above.

- ✓ Provided for by rugged AMOT element construction. No AMOT element has ever stuck closed since its introduction 6 years ago. Many years of "know how" are built into every AMOT element.
- ✓ Omission of all hand operators means engine temperature is safe from tampering by engine attendants. AMOT is the only engine thermostat that can be considered safe without a hand operator.
- ✓ Lack of capillary tubes, bulbs, and packing glands means no failures from kinks or leaks.

SERVICE There is only one replacement part—the element. Renewal of element renews all working parts. Element replacement, if ever required, is several times faster than on any competitive make. Original accuracy of temperature setting is always provided in element replacement.

- ✓ AMOT engineers are available in most major cities to help on application and other problems.
- ✓ Most models are available from stock for rush orders.

MODELS 1/2" to 6" pipe sizes. Larger sizes in iron, bronze or ductile iron.

AMOT CONTROLS CORPORATION

FIRST ST. & NEVIN AVE.
RICHMOND, CALIFORNIA

MANUFACTURERS OF QUALITY ENGINE THERMOSTATS & SAFETY CONTROLS

Marketing Promotions



W. C. Cheek

Several promotions in the Marketing Division of Worthington Corporation have been announced by T. J. Kehane, Vice President in Charge of Marketing. William C. Cheek is appointed Midwest Region Sales Manager. A graduate of North Carolina State College, 1920, where he obtained a degree in Mechanical Engineering, Mr. Cheek entered the Worthington sales training program the same year. For three years he served in the corporation's Buffalo Division Sales Department, subsequently serving in the Water Works Department at the New York Office and in specialized Public Works and Petroleum Industries capacities at the Harrison, N. J. Division. In 1932 he was assigned to the corporation's Chicago District Office as a General Line Salesman and in 1937 was appointed Assistant Manager of the Chicago District Office. In 1945 Mr. Cheek was appointed Manager of the Chicago District Office, the post he held until his present appointment.



J. H. Loomis

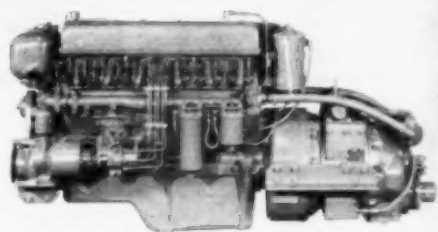


Hollis H. Wise

John H. Loomis replaces Mr. Cheek as Manager of the Chicago District Office. Formerly Manager of the corporation's St. Louis District Office, Mr. Loomis is a graduate of Purdue University, class of 1942, where he obtained a degree in Mechanical Engineering. He joined Worthington Corporation in 1945, serving as an application engineer in the Buffalo Division Compressor Sales Department prior to his assignment to the corporation's Chicago District Office as Compressor Specialist in 1947. He subsequently served as general line salesman and in 1955 was appointed Manager of the St. Louis District Office. Hollis H. Wise is appointed St. Louis District Manager. A graduate of Lawrence Tech. where he obtained a degree in Mechanical Engineering, Mr. Wise joined Worthington Detroit Office in 1938 and was named Office Supervisor in 1940. He subsequently served as Louisville resident salesman and Cincinnati General Line Salesman. In 1953, Mr. Wise was named resident general line salesman out of Indianapolis, the post he held until his present appointment. He is a member of the Indianapolis Rotary Club, the American Society of Mechanical Engineers, and is a licensed professional engineer in the State of Indiana.

Graymarine Diesel Models

Gray Marine Motor Co. will be very much in evidence at the Motor Boat Show with a line of marine diesel engines. Gray's diesel six D427 engine



Graymarine six D427 diesel.

is now rated 130 hp at 2400 rpm (intermittent) and 100 hp at 2400 continuous. This engine weighs only 1475 lbs with gear. New for this show is the Six-D802 diesel, rated 190 hp at 2200 rpm with an

802 cu in. block of chromium-molybdenum-iron alloy. Other Gray diesels are listed at 25 hp (ideal for sailing auxiliaries), 30 hp, 60 hp, and 150 hp. All Graymarine diesels are four cycle and feature fresh water cooling as standard equipment.

NOW AVAILABLE! The Brand New **DIESEL ENGINE CATALOG**, Volume 22. This giant, 400 page, 10 1/2" x 13 1/2", fully illustrated reference book containing complete and detailed engine and accessory sections is the biggest and best yet. Mail orders are now being filled for this "Bible of the Industry," which has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid plus California sales tax where applicable. Send checks or company orders to **DIESEL PROGRESS**, 816 N. La Cienega Blvd., Los Angeles 46, Calif.

**The economical,
trouble-free way to
boost engine power!**

**MIEHLE-DEXTER
ROTARY POSITIVE
3-LOBE
SUPERCHARGERS**

**12 production models...
the unit you need for
the power you need**



MODEL 40055



MODEL 55075



MODEL 5511



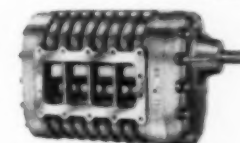
MODEL 3210



MODEL 4012



MODEL 4009



MODEL 5514



MODEL 5518

PROVED IN OVER

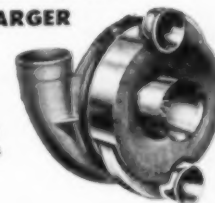
20 YEARS OF SERVICE

m d **iehle
exter**

**SUPERCHARGERS
TURBOCHARGERS
INDUSTRIAL BLOWERS**

**PLUS... The Revolutionary New
m-d TURBOCHARGER**

Exclusive Miehle-Dexter monorotor design boosts fuel efficiency, develops high pressure ratios up to 3 to 1.



Miehle-Dexter Supercharger Division, Racine, Wisconsin • Telephone MEIrose 4-5521 • Another Product of Miehle-Goss-Dexter, Inc.

Mid-West Diesel News

By L. H. Houck

VALSTAD Quarry, Carrollton, Ill., has added a GM Series 4-71 diesel to its power equipment. Delivery was made by Western Machinery & Engine Co., St. Louis.

YELLOW TRANSIT, Kansas City, is adding 80 more Kenworth tractors. These units have Cummins JT6B diesels. Yellow almost doubled its fleet since purchase of Michigan Motor Freight Lines.

JONES Truck Lines, Springdale, Ark., with 12 diesel units in its fleet, has added four new Mack Thermodyne diesels from Skelton Motor Co.

MUSEUM OF Transport, St. Louis, which has the largest collection of retired steam locomotives in the world, plans to develop a diesel exhibit and is

currently making arrangements to get the first diesel locomotive in the country now owned by the Baltimore & Ohio railroad.

BOONVILLE Collieries, Wright Mine, Boonville, Ind., has repowered a Euclid 18 LTD with a Cummins NHRIS 320 hp diesel. Cummins Diesel Sales of Evansville handled the sale.

GARRETT Freight Lines, Pocatello, Idaho, has added 15 Kenworth tractors with Cummins NT-600 diesels to its fleet.

FRAZIER-Davis Construction Co., St. Louis, has taken delivery on a GM diesel 60 kw generator set from Western Machinery & Engine Co.

RUDY KLEMA, owner of the United Super Market in Falls City, Neb., has installed a 60 kw Waukesha engine to provide all the electrical power used in his large super. Unit is powered by

Waukesha Model 140 GK, 6 cylinder, 525 cu in. engine using natural gas for fuel. Sale was made by AAA Engine & Electric, Inc., Kansas City, Kansas.

MIDWEST Industrial & Marine Co., 835 N. Capitol, Indianapolis, has been appointed to handle the International Harvester power unit line which includes the new 4-cycle UDT-1091 Turbo-torque diesel, 250 hp at 1500 rpm.

SKELTON Motor Co., Springdale, Ark., recently delivered a Mack diesel COE Truck to Steele Canning Co., Springdale. Its fleet now has four diesel units.

A NEW over-the-road fleet is the Garrard Truck Leasing Co., Columbus, Miss., which is using all International Harvester R200's with Cummins JT 175 hp diesels. Cummins Diesel Sales Corp., Memphis, made the sale.

JAMES & Beckman, Pierre, S. D., have repowered three Euclid 9 LDT's with NHRS 320 hp Cummins diesels from Cummins Mid-West Co., Inc., Omaha.

ET&WNC Transportation Co., Johnson City, Tenn., has added 20 White tractors to its fleet—Model 9000 with Cummins JT6B diesels.

WESTERN Machinery & Engine Co., St. Louis, has delivered 12 GM 2-71 diesels to Ortruc, Inc., for installation in underground mine trucks recently developed for metal mining.

BADEN Equipment Co., St. Louis, took delivery recently on a GM 4031C and a GM 3030C diesels to be used on irrigation pumps.

SUPER-SERVICE Motor Freight Co., Nashville, has just completed a \$4 million improvement and expansion program which included 175 new White diesel tractors, according to R. M. Crichton, president, who said the company has now acquired rights into Chicago, St. Louis and Evansville, Ind.

RICHARD Gumz Farms, North Judson, Ind., has placed a water pumping unit in service powered with a Cummins JF6P, 110 hp diesel from Cummins Diesel Sales Corp., Indianapolis.

JOE ROBINSON, produce hauler, Springdale, Ark., now has 25 diesel tractors in his fleet. Nine Mack Thermodynes were added this year.

Shipyard Expands

National Steel and Shipbuilding Corporation of San Diego, California, announced the acquisition of the adjacent Martinolich Shipbuilding Company for an undisclosed sum. Already classed as

one of the five most important shipyards on the West Coast, National Steel and Shipbuilding adds fifteen acres of waterfront property, a 2,800 ton floating drydock, 1,000 ton marine railway, two 1,000 ton launching ways, two 650 ft out-fitting piers as well as extensive carpenter shops, machine shops and sheet metal facilities. Milton F. Fillius, Jr., Vice President and General Manager of National Steel and Shipbuilding Corporation, stated that work was already underway to consolidate the two plants and that qualified employees of Martinolich would be utilized by National Steel in their expanded activity. Messrs. Anthony and John Martinolich, will be retained by National Steel in an advisory capacity.

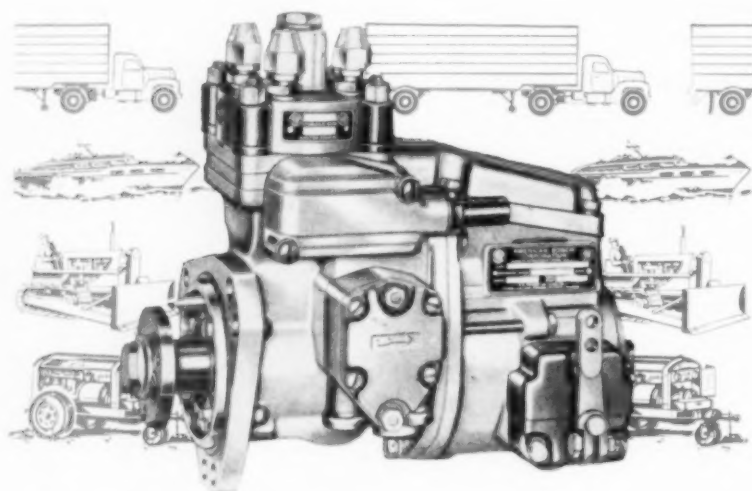
This purchase by National Steel coupled with its own highly developed ship repair capability, will enable the yard to drydock and overhaul all classes of vessels to 3,000 tons with deep water dock-side repair facilities for ships to 650 ft in length. National Steel and Shipbuilding's construction facilities are suitable for single vessels up to 4,000 tons and 400 ft in length, with two marine railways and two building ways for concurrent construction of smaller vessels up to 1,000 tons. Under construction at the present time, are a 350 ft prototype Beach Discharge Lighter for the Army Transportation Corps, a wooden torpedo retriever for the U. S. Navy and two 127 ft steel tuna clippers for commercial service. This yard was also the recent successful bidder for a five and a half million dollar hydrographic survey ship, scheduled for delivery in 1959.

High Pressure Solenoid Valve

A new 2 way high pressure solenoid valve is now available from the Automatic Switch Company of Florham Park, New Jersey, designers and manufacturers of ASCO Solenoid Valves and Electromagnetic Control. Especially suited for hydraulic applications, such as hydraulic lifts and elevators, these heavy duty constructed valves are designed for tight shutoff on pressures to 1500 psi. They may be mounted in any position without affecting operation. The ASCO Bulletin 8223 valves are of the internal pilot operated piston type having angle bodies, available in either stainless steel or brass bar stock with teflon discs and stainless steel magnetic parts. Normally closed operation only. Valves may be supplied for continuous or intermittent service, depending upon the application.

Available in 1/2 in. or 3/4 in. pipe connections and with General Purpose, Water-tight or Explosion-Proof solenoid enclosures. For complete details, including prices, ask for brochure on Bulletin 8223.

ITS NEW



Key to top performance... the PSB fuel injection pump

The PSB Fuel Injection Pump has established an unmatched record for dependable and economical diesel engine performance.

Proven design—here's a fuel injection pump with fewer parts and simple construction, employing positive governor control and a replaceable hydraulic head for fast field servicing.

Outstanding operating economy—from precise fuel metering and accurate distribution... the PSB Fuel Injection Pump's efficient design and careful manufacture assure long, trouble-free operation with minimum maintenance.

Backed by low-cost repair service—from "original-maker" repair by factory-trained experts at Authorized American Bosch Service Stations... nearly 200 in North America, Hawaii, and Puerto Rico... all equipped with special tools and test equipment, and stocked with genuine American Bosch replacement parts.



AMERICAN BOSCH
DIVISION
AMERICAN BOSCH ARMA
CORPORATION
SPRINGFIELD 7, MASS.

5277

Northeast Diesel

Notes

By Arnold B. Newell

W.C.A. Hospital, Jamestown, N. Y. installed a Detroit Diesel generator set, Model 62508, 150-175 kw, powered by a Model 62406 RD, 228 hp, Series 6-110 GM engine. T. E. Potts Equipment Co. Inc. of Buffalo, New York was the supplier and Mr. Donald C. Fuller was Consulting Engineer for the Hospital.

A GENERAL Motors Detroit diesel engine Model 2055, 46 hp, Series 71 was bought by Charles A. Stutzman, Lancaster, New York for repowering a Koehring Backhoe Model 205, 1½ cu yd capacity. T. E. Potts Equipment Co. of Buffalo, N. Y. made the sale.

EIGHT EUCLIDS, Models IFFD, capacity 24-yards and powered by GM 6-71 diesels were purchased by the Sullivan Trail Coal Company of Exeter Avenue, West Pittston, Pa. Standard Equipment Co. of Kingston, Pa. was the vendor.

STANDARD Equipment Company of Kingston, Pa. sold a Euclid, Model IUD, 10 Ton capacity, powered by a General Motors 125 hp, Series 4-71 diesel to Bethlehem Lime Stone Company.

T. E. POTTS Equipment Co. of Buffalo, N. Y. sold a 10 in. Centrifugal Pump to work on dredge, constructed by Glenn H. Solomonson of Jamestown, N. Y. It is powered by a GM Detroit diesel, Model 6082, 155 hp, Series 71 with a torque converter.

MOREHEAD City, (N. C.) Shipbuilding Corporation recently delivered a new Hatteras Trawler named *Miss Vickie* to Meadow Seafood Company of Beaufort, N. C. She is powered by a HMR-600 Cummins diesel engine turning a 42 in. x 34 in. 4-blade Southernner propeller wheel through a Capitol 3.88 to 1 reduction gear. It is equipped with a continuous-running Marlow pump and the auxiliary generator is a 750-watt Onan. The batteries are Surrettes.

A 100-KW diesel electric generating set was sold to the Bechtel Corporation of New York City for power at the Reynolds Aluminum Plant in Massena, New York. This generator is powered by General Motors, Detroit diesel, Model 6030C. The Griffin Equipment Corp. of New York City made the sale.

THE Griffin Equipment Corporation of New York City has re-powered a Northwest Model #4 Crane with a General Motors, Detroit diesel Model 4055C for the Fishkill Builders Supply Company of Newburg, New York.

Straight Form Thermometer

Although their angle form stainless steel thermometer has been in industrial use for many years, W. C. Dillon and Company, Inc., Van Nuys, California, has just announced that a new straight form model has been added to the line. One of the key features of this new unit is an adjustable mounting nut which makes it possible to turn and lock the head in position for maximum visibility. The straight form type of construction is well adapted to installations on top of tanks, boilers, in high locations or other areas where it would be impractical to utilize the standard angle form unit. These instruments are made in both 3 in. and 5 in. head sizes and can be supplied in stem lengths of from 2½ in. to 72 in. with all intermediate steps. Head is a heavy casting and is finished in gray with chromium plated bezel. Standard installation is with a 1½ in. N.P.T. mounting nut, but special mountings can be made to order. Ranges are available as follows: -40-160°F, 0-200°F, 50-300°F, 50-500°F, 150-750°F, 200-1000°F, -10-110°C, 0-100°C, 0-150°C, and 0-300°C. Each instrument is individually calibrated, and accuracy is within 1% of the range over the entire scale. All are capable of withstanding considerable accidental overloads without damage to calibration, according to the manufacturer.

ITS NEW

Sales Promotions

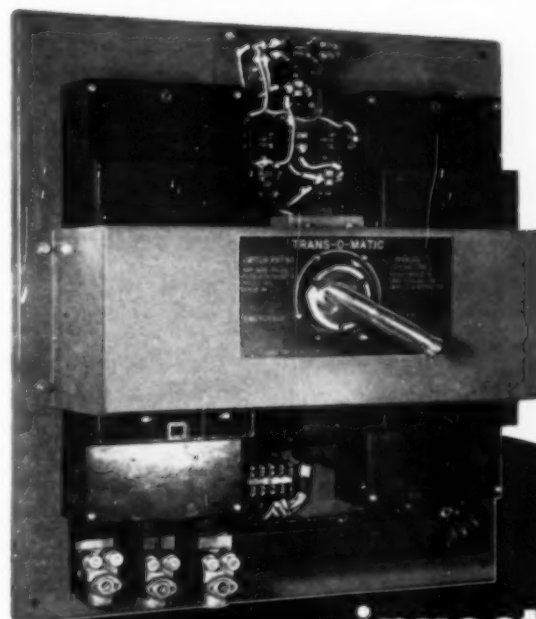
Cummins Engine Company of Columbus, Indiana has announced the promotion of four men to new positions with the Company. C. R. Boll, Vice President-Sales, announced the advancement of R. F. Davis, B. K. Jacob, T. J. Paxton and J. E. Grimmer to new positions. Mr. Davis has been named Manager-Fleet Sales, and in his new position is responsible for the sale of Cummins Diesel Engines to fleet accounts in the eastern half of the United States. He joined the Company in 1942 and has served as Manager of Engine Sales and Assistant Regional Manager, central. Prior to his new appointment he was Regional Manager, eastern. In his new position he will coordinate the activities of regional offices and distributors and work with major fleet accounts in the trucking and construction industries.

Mr. Jacob succeeds Davis as Regional Manager, eastern, transferring from the Company's Great Lakes regional office in Cleveland, Ohio. At Cleveland, Jacob served as Company representative. He joined the Cummins organization in 1934 and was transferred to the Great Lakes region in December of 1955. Both Jacob and Davis are stationed at 1460

Chrysler building, East, New York 17, New York. Mr. Paxton assumes the new post of Manager-Distribution, western, for the Company and is headquartered at the Company's factory in Columbus, Indiana. Prior to his promotion, he was Regional Manager for the Cummins Rocky Mountain regional office, Denver, Colorado. In his new capacity, he is responsible for activities of the Cummins

regional offices in the western half of the United States and the Cummins distributors in that area. Mr. Grimmer succeeds Paxton as Regional Manager of the Rocky Mountain regional office in Denver. He joined the Cummins organization in 1953 and was employed in manufacturing sales at the home factory and subsequently served as Central Region representative in Chicago.

if **YOU'RE** responsible
for **POWER CONTINUITY**



TOTAL FAILURE
PROTECTION

PARTIAL VOLTAGE
FAILURE
PROTECTION

POSITIVE NORMAL
OR EMERGENCY
POSITIONS ONLY

investigate
TRANS-O-MATIC
AUTOMATIC TRANSFER
SWITCHES

Trans-O-Matic's compact, failure-proof design employs two standard circuit breakers, one from the normal and one from the emergency source, either of which will supply the load. Relay-actuated motor operates circuit breakers for positive mechanical transfer with continuous service in normal or emergency position. Available in capacities to 600 volts, 800 amps, interrupting capacities to 50,000 amps RMS. Prompt delivery in most sizes.

OPTIONAL FEATURES

Adjustable time delay on restoration to 20 minutes •
Engine starting contact • Test pushbutton • Pilot lights
for switch position • Special enclosures

LAKE SHORE *Electric* **CORPORATION**
BEDFORD, OHIO

West Coast News

By James Joseph

INSTALLED in the recently launched vertical-axis propeller U.S. Army Beach Discharge Lighter *Lt. Col. John U. D. Page*, were two Fairbanks-Morse 6-cylinder model 38D8 $\frac{1}{2}$, 1200 hp at 850 rpm, engines as main propulsion.

FURNISHING service power to the same ship are four Caterpillar diesels; three D375 (4-cycle, V-8) direct connected to Electric Machinery generators; and an auxiliary standby Caterpillar D318, a 6-cylinder engine delivering 40 kw. Each of larger Cats produce 175 kw.

DELIVERED: two Fairbanks-Morse model 49, 220 hp diesel-driven turbine pumps to Albert Engineering Co., San Francisco, Calif.

INSTALLED in a Mack LMSWL truck,

owned by International Paper Co., Vaughn Division, Eugene, Oregon, a Cummins 220 hp NHB diesel.

TO AMERICAN Independent Oil Co., San Francisco, a 10 cylinder, model 38F5 $\frac{1}{4}$, 800 hp diesel engine from Fairbanks-Morse.

AN EVEN larger Fairbanks-Morse has gone to National Steel & Shipbuilding Corp., San Diego. The engine is a 6 cylinder, 960 hp model 38D8 $\frac{1}{2}$ marine diesel.

FOR ANDERSON Burke Corp., Bellevue, Wash., a Model 38D8 $\frac{1}{2}$ Fairbanks-Morse, 10 cylinder, 1600 hp diesel generating set.

OLYMPIAN Dredging Co.'s dieselization of the dredge *Golden Gate* completes switchover of company's major dredges from steam to diesel. Other recent conversions, all GM dieselized, are

dredges *Olympian Monarch*, *Neptune*, and *Holland*. All work in San Francisco-Sacramento areas. Engineering by Guntert & Zimmerman, Stockton, Calif.

TO BECHTEL Corp., San Francisco, a Fairbanks-Morse model 49B4 $\frac{1}{2}$, 3 cylinder diesel engine.

POWERING a General Electric locomotive owned by Oregon Steel Mills, Portland is a Cummins HRFBI 190 hp engine.

FOR WILCO Construction Co., San Francisco, a 2 cylinder, 48 hp Fairbanks-Morse engine, model 49B4 $\frac{1}{2}$.

KOIDAHL Logging Co.'s Baldwin-Lima-Hamilton 25-ton log loader is powered by a model 4080 GM diesel rated 143 hp at 2100 rpm. Sale by Evans Engine & Equipment Co., Seattle.

INSTALLED in Harbor Plywood Corp.'s 1 cu yd Baldwin-Lima-Hamilton 44T dragline and clamshell, a GM 4-71 diesel.

SEATTLE'S N. Fiorito Co. has repowered three of its Euclid model TS-24 twin power scrapers with GM diesels. Front engines are GM 6-110s and rear engines, GM 6-71s.

TO LEIGH Sales Corp., Los Angeles, a Fairbanks-Morse 6 cylinder, 180 hp model 49B4 $\frac{1}{2}$ diesel engine driven generator set.

TO UTAH & Arizona TV, Kanab, Utah a 5 $\frac{1}{4}$ hp, model 45B3 $\frac{1}{4}$ Fairbanks-Morse diesel generating set.

FOR BILLINGS, Montana's Transport, Inc., a Cummins NRTO 335 hp engine for firm's Kenworth CC524 truck.

DELIVERED: a 6 cylinder, 180 hp model 49B4 $\frac{1}{2}$ Fairbanks-Morse diesel engine to American Independent Oil Co., San Francisco.

DRIVING two main hoist drums on Olympian Dredging Co.'s clamshell dredge *Golden Gate*, is a twin GM 6-110, 400 hp diesel. Dredge's service power is supplied by a GM 2-71 dc generator set.

nated Planning and Plant Engineering, Production Control and Quality Control. Hugh Boggs has been named Manager of Planning and Plant Engineering. He joined Caterpillar in 1936 as a machinist apprentice. He was Factory Manager at the Company's Joliet Plant from 1950 to 1955 when he returned to Peoria as Manager of Manufacturing General Office. Roy McCluskey has been appointed Manager of Production Control. A former vice president and general sales manager of R. G. LeTourneau Inc., of Peoria, McCluskey joined Caterpillar in 1953 as Administrative Assistant to the Domestic Sales Manager. He has served as Pricing Manager in the Company's Merchandise Department for the past two years. Dale Wright, Chief Metallurgist at Caterpillar since 1955, will be Manager of Quality Control. He entered the Company's college graduate training program in 1934 and became a metallurgical staff engineer two years later.

Diesel Bulletin

The Model 65 Superior stationary diesel is described in new Bulletin #111 offered by White Diesel Engine Division, The White Motor Company, Springfield, Ohio. According to the literature, Model 65's are built as four cycle, six or eight cylinder, vertical, in-line engines. Power range is 580 to 2150 bhp continuous. Engines are used with generators of 400 to 1500 kw. They are available naturally aspirated or supercharged, left or right hand, clockwise or counter-clockwise rotation. Model can be furnished as a dual-fuel engine, which operates on either 100% oil or natural gas with pilot fuel injection for ignition. It handles non-premium fuels for lowest cost power production. The bulletin lists typical applications as municipal, public utility, institution, and office building power plants; water works and sewage disposal plants; pipe line pumping; dredges, quarries, and other general industrial applications. Included in the eight page, two color bulletin are product photos, construction feature illustrations, specifications, and performance curves. For free copies, write: Harry Clark, Adv. Mgr., White Diesel Engine Division, Springfield, Ohio.

Motor and Generator Folder

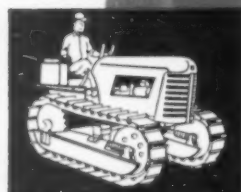
A new catalog-folder No. SP-182 describes Marathon Electric d-c motors and generators, their general construction features, with cutaway illustrations. Included are dimensions and ratings from $\frac{1}{2}$ to 200 hp on motors and $\frac{3}{4}$ to 200 kw on generators, with illustrations on applications in several typical industries. Copies of this new catalog-folder may be obtained by writing Marathon Electric Manufacturing Corporation, Wausau, Wisconsin.

Manufacturing Reorganization

Caterpillar Tractor Co. has announced reorganization of its Manufacturing General Office into three departments. Vice President C. A. Woodley said the move will provide the Company's domestic plants and foreign subsidiaries with improved service on manufacturing problems. As Director of Manufacturing, L. J. Ely will give administrative guidance to the three departments, which are desig-

lower initial cost lower service cost

Compare and you will see the ROOSA MASTER fuel injection pump costs less. Use it and you will see that your service costs less. There are fewer parts to service and repair because of the unique design of ROOSA MASTER. It takes less space on your engine, and weighs less than 10 pounds. Even though small in size and light in weight one size serves either a 2, 3, 4, 6 or 8 cylinder engine.



The result of 17 years of engineering development is proven in hours and miles of outstanding performance.



HARTFORD MACHINE SCREW CO., HARTFORD 2, CONN.
DIVISION OF STANDARD SCREW COMPANY

makes good diesels better



Member



YOU CAN DEPEND ON THE DIESEL THAT DEPENDS ON ROOSA MASTER

Contract Administrator

Sheldon Matzkin has joined Consolidated Diesel Electric Corporation as Contract Administrator, it was announced recently by Norman I. Schaffer, President of Con Diesel. Mr. Matzkin comes to Con Diesel from the Leowy-Hydropress Division of Baldwin-Lima-Hamilton Corp., where he was chief mechanical engineer of the industrial projects department. In this capacity, he contributed to the United States Air Force Heavy Press Program, the Vanguard (Earth Satellite) Missile Program, the U. S. Navy Guided Missile Ship Simulator and other projects. Prior to his service with Baldwin-Lima-Hamilton, Mr. Matzkin was a project engineer with Skidmore, Owings & Merrill assigned to engineering design for U.S.A.F. North African bases. Mr. Matzkin has a bachelor of mechanical engineering degree from New York University and a bachelor of laws degree from Brooklyn Law School. He is a member of the New York State Bar and the American Society of Heating and Air Conditioning Engineers.

Service Training School

Two huge vans containing nearly \$50,000 worth of tractor assemblies and components are bringing a complete factory service training school directly to J. I. Case Industrial dealers throughout the nation. An experienced staff of Case servicemen accompanying each Mobile Training unit will present 3-day courses in maintenance and service of Case TerraTrac wheel and crawler tractors and equipment in various dealer's shops. One unit is now operating in the mid-west and far-west, while the other visits the eastern and southern U.S. According to Hugh Seltenright, Case Industrial Service Manager, use of mock-up, cut-away and tear-down units enables dealer service personnel to observe the action, as well as to actually disassemble, every important tractor component from the engine down to the hydraulic valves. Colored slides, charts and other visual aids are also used. The 30 ft trailers, painted bright TerraTrac yellow with blue lettering, are equipped with electric hoists operating on monorails, for unloading heavy parts such as complete engines, transmissions, torque converters, and sub-frame assemblies.

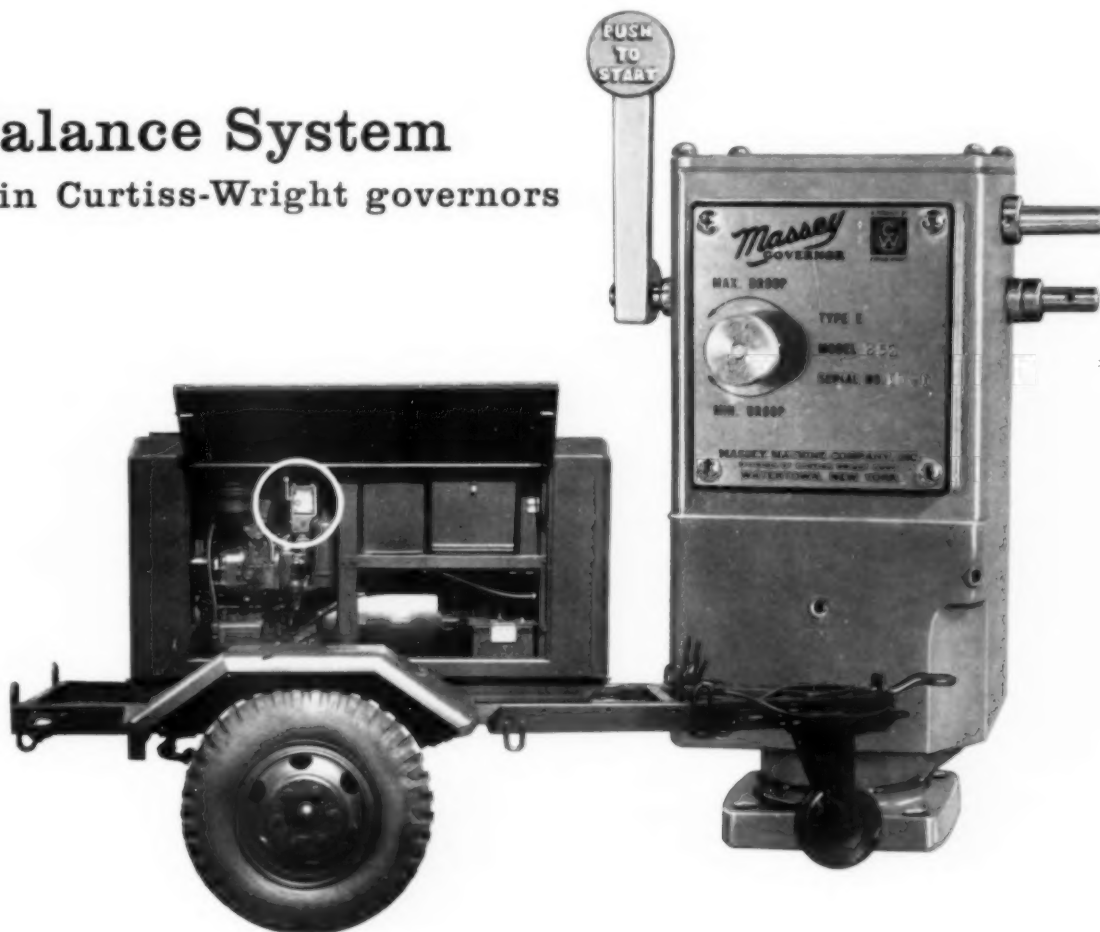
One of the many interesting training units is a mock-up of the counter-rotating Terramatic transmission used in TerraTrac Model 800 and 1000 crawlers. Although this unique transmission provides instant power-shifting, with independent control of each track (through a system of constant-mesh gears actuated by hydraulic clutches), viewers are intrigued at its simplicity and the ease

with which it can be disassembled. The Case Co. recently announced that the service warranty on this transmission has been extended from 6 months to one year, due to its good field performance. Also included is a complete sub-frame assembly for the TerraTrac Model 800, showing operating controls for the hydraulic transmission, as well as the exclusive torsion-bar track suspen-

sion and equalization system. This system, used on Model 800 and 1000 loaders as well as dozers, permits each track frame to oscillate freely up and down so that full traction is maintained even on the roughest ground. Cut-away units include gasoline and diesel engines, hydraulic pumps and valves, hydraulic and mechanical clutches, torque converters, track rollers, and other parts.

NOW AVAILABLE! The Brand New **DIESEL ENGINE CATALOG**, Volume 22. This giant, 400 page, 10 1/2" x 13 1/2", fully illustrated reference book containing complete and detailed engine and accessory sections is the biggest and best yet. Mail orders are now being filled for this "Bible of the Industry," which has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid plus California sales tax where applicable. Send checks or company orders to **DIESEL PROGRESS**, 816 N. La Cienega Blvd., Los Angeles 46, Calif.

Balance System in Curtiss-Wright governors



maintains peak efficiency in generator output

The refined compensation system used in both Marquette and Massey governors tells the power piston where to stop and wait for the engine to come back to speed. This provides maximum steady-state speed regulation with minimum recovery time for full load changes.

The Massey Type E governor, designed for use on portable generators, has the additional advantages of mechanical simplicity and positive hydraulic power to move throttle controls in either direction.

These same features are built into the entire family of Curtiss-Wright governors with adaptations for diesel, gas or dual-fuel engines. Our engineering department and district service representatives will help you in the selection of the governor best suited to your specific requirements. Address your letter to Marquette Division, Curtiss-Wright Corporation, Cleveland 10, Ohio.

Marquette
GOVERNORS

Massey
GOVERNORS

MARQUETTE DIVISION

CURTISS-WRIGHT

CORPORATION • CLEVELAND 10, OHIO

Other Marquette Products: AIRCRAFT WINDSHIELD WIPERS • ANTI-FRICTION BEARING TEXTILE SPINDLES • SPRING CLUTCHES
PRECISION PARTS AND ASSEMBLIES • ROTARY OIL PUMPS

Towboat Building Program

Dravo Corporation unveiled plans recently for an unusual towboat building program. At the company's Neville Island shipyards, two new 3200 hp towboats are now under construction for stock. In building such powerful vessels before orders have been placed, Dravo is making a significant departure

from standard shipbuilding practice. The program will enable an operator to obtain a delivery in less than half the time normally required for design, engineering and construction of such equipment. During river trials, a Dravo-3200 vessel, completed a few weeks ago, pushed a three-barge, 8500-ton integrated oil tow at nearly 13 miles an hour and a 20-barge, 18,000-ton coal tow at

6.5 miles an hour. Both speeds are high for these types of river operations.

Design of the Dravo-3200 was based on research and model basin testing in this country and abroad. The hull has been shaped to allow a maximum flow of water to the propellers, especially in shallow water, thus producing greater propulsive thrust, or push power. The

two 81½ ft diameter stainless steel propellers have been specially designed by Dravo for these vessels to give maximum propulsion ahead and astern. The design and material used in these propellers assure unusually long service life. They are enclosed in Kort nozzles that add at least 25 per cent more push power by controlling the flow of water to, through and from the propellers. In the Dravo-3200, Kort nozzles and steering system have been scientifically coordinated to produce a new standard of maneuverability. Hydraulic steering systems operate the six streamlined rudders. Two rudders are installed ahead of each propeller for backing and flanking, and one rudder is behind each propeller for steering the vessel forward.

The Dravo-3200 is 148 ft long, with a beam of 34 ft and a depth of 10½ ft. Of welded steel construction throughout, the new towboat carries machinery, fuel tanks and other equipment in the hull. The superstructure includes main deckhouse, upper deckhouse and pilothouse. In the main deckhouse are quarters and lounge for the crew, an all-electric galley, messroom and other facilities. The upper deckhouse has quarters and lounge for other crew members and guests. The pilothouse, located on the top of the forward end of the upper deckhouse, contains all operating controls. Dravo naval architects stated that the new towboat class meets every requirement for modern river towing. The 3200-horsepower vessels can be used interchangeably for towing services that require either precise handling of maximum size tows or operation of streamlined high speed tows.



To the Employee Relations Director of every American company

LET'S FACE IT . . . the threat of war and the atom bomb has become a real part of our life—and will be with us for years. Fires, tornadoes and other disasters, too, may strike without warning.

The very lives of your employees are at stake. Yours is a grave responsibility. Consider what may happen.

When the emergency comes, everybody's going to need help at the same time. It may be hours before outside aid reaches you. The best chance of survival for your workers—and the fastest way to get back into production—is to know what to do and be ready to do it. To be unprepared is to gamble with human lives. Disaster may happen TOMORROW. Insist that these simple precautions are taken TODAY:

☐ **Call your local Civil Defense Director.** He'll help you set up a plan for your offices and plant—a plan that's safer, because it's entirely integrated

with community Civil Defense action.

☐ **Check contents** and locations of first-aid kits. Be sure they're adequate and up to date. Here again, your CD Director can help—with advice on supplies needed for injuries due to blast, radiation, etc.

☐ **Encourage personnel** to attend Red Cross First Aid Training Courses.

☐ **Encourage your staff** and your community to have their homes prepared. Run ads in your plant paper, in local newspapers, over TV and radio, on bulletin boards. Your CD Director can show you ads that you can sponsor locally. Set the standard of preparedness in your plant city. There's no better way of building prestige and good employee relations—and no greater way of helping America.

Act now . . . check off these four simple points . . . before it's too late.



SPACE FOR THIS

CIVIL DEFENSE

MESSAGE CONTRIBUTED BY

R. J. Tamm



New Product Bulletin

A new technical bulletin on its Series RS Centrifugal Compressors for gas processing work is announced by Cooper-Bessemer Corporation. The 24 page bulletin gives complete construction details, engineering application data, and dimensions. Capacities range from 1,000 to 100,000 cfm. The bulletin is available by writing The Cooper-Bessemer Corporation, Mount Vernon, Ohio and requesting Bulletin C-83.

Generators Delivered

American MARC Inc. has begun first deliveries of 454 static exciter 45 kw 400 cycle generators to prime contractor Stewart & Stevenson Services, Inc. of Houston, Texas. Designed and manufactured by American MARC's Electro-Dynamics Division, the generators are for use by the U. S. Army Corps of Engineers which will use them to power electronics equipment at missile launching sites and other ground operations. The static exciter generators represent the first production of the Electro-Dy-

namics Division and are part of a \$809,000 contract which also includes 117 conventional 20 kw generators for ultimate use by the U. S. Marine Corps. Production of the generators has been established at approximately 100 per month. The contract calls for completion of deliveries by April, 1958.

Realigns Industrial Sales Division

Wencel A. Neumann, Executive Vice President of the De Laval Separator Company, has assumed the responsibility of The Company's Industrial Division sales and sales policies, in addition to his previous responsibilities in the Manufacturing, Engineering and Industrial Relations Divisions. Also named to new posts were G. Frederick Wheelwright, Assistant to the Executive Vice President; Frank E. Lawatsch, Manager of Industrial Equipment Application; William C. Porch, Manager of Industrial Sales for the Company's Eastern District.

Catalog On Filtration Equipment

A new catalog has been published on Fulflo and CFC Filtration Equipment for micronic clarification of all types of fluids: lubricating and fuel oils; liquid chemicals and petro-chemicals; compressed air, carbon dioxide, and other gases; hydraulic fluids; electroplating solutions; coolants; quenching and rolling mill oils; insulating oils. Filters are designed for high or low flow rates and pressures. Container metals and elements allow for handling solutions of varying pH, temperature and viscosity. The catalog describes and illustrates each type of Fulflo Filters which employ honeycomb filter tubes in single or multi-tube arrangement. A wide range of densities allows for filtration to any degree of micronic clarity. The CFC Filters described include Honan-Crane and Michiana models, models for surface full-flow filtration and for by-pass applications. In addition, CFC Filters are available for filtration of dissolved as well as solid impurities. Also included are models for clarifying coolants, magnetic separation, conditioning insulating oil and other similar applications. Catalog is available on request to Commercial Filters Corporation, 2 Main Street, Melrose, Massachusetts.

Overseas Operation

Eaton Manufacturing Company in conjunction with important Brazilian interests has formed a new automotive parts manufacturing company—Eaton S. A. Industria de Pecas e Acessorios—with headquarters in Sao Paulo, Brazil, John C. Virden, Chairman and President of

Eaton, announced recently. A majority of the stock of the new corporation, chartered by the Republic of the United States of Brazil, State of Sao Paulo, is owned by Eaton and a minority interest by the firm of Tavares & Pinheiro S. A. Engenharia, Industria E Comercio, of Sao Paulo, Brazil. The capital investment in Eaton S. A., when manufacturing operations begin, will be approximately \$1,000,000, according to Mr. Virden and Tasso Pinheiro of Tavares & Pinheiro S. A. who will be the Director-President of the new company. Construction will begin soon on a 25,000 sq ft, one-story factory building of contemporary design, located on an 11-acre site on the Rio-Sao Paulo Highway near the city of Sao Jose dos Campos, about 60 miles from Sao Paulo. The new factory will be completed and ready for production early in 1958.

Trucks For Texas

Delivery of 20 new Kenworth Model 908 trucks to Sunset Motor Lines of El Paso, Texas, is announced by Lewis T. Gerlach, general sales manager for Kenworth Motor Truck Company of Seattle. Sunset Motor Lines is an intra-state hauler of general commodities in the State of Texas. The firm's routes extend from El Paso to Houston and north to Amarillo. Routes include San Angelo, Dallas, Fort Worth and intermediate points. Latest additions to the Sunset fleet are Kenworth's drop-frame front-end conventional highway type trucks. Powered with 180 hp turbo-charged Cummins JT-6-B diesel engines, these steel-frame Kenworths have 10-speed transmissions with direct drive in tenth gear. These 38,000-lb capacity tractors are equipped with Kenworth's FTO suspension, which places the trailing axle in front of the drive axle. This light weight four-spring rear suspension provides maximum payload with one-third, two-thirds weight distribution. The order was placed through the Phoenix branch of J. T. Jenkins Company, Kenworth distributor.

Service Appointments

Appointment of C. J. Wilhite as manager-field service for the Cummins Engine Company, Inc. has been announced by C. E. Martin, general service manager. Wilhite has been affiliated with the Cummins Engine Company since 1939 and was assistant sales manager prior to his new appointment. He also has served the Company as Northwest Regional Manager. In his new capacity, Wilhite is responsible for coordinating the activities of area service managers and the export and manufacturer service managers.

V. V. Boll has been named Manager-

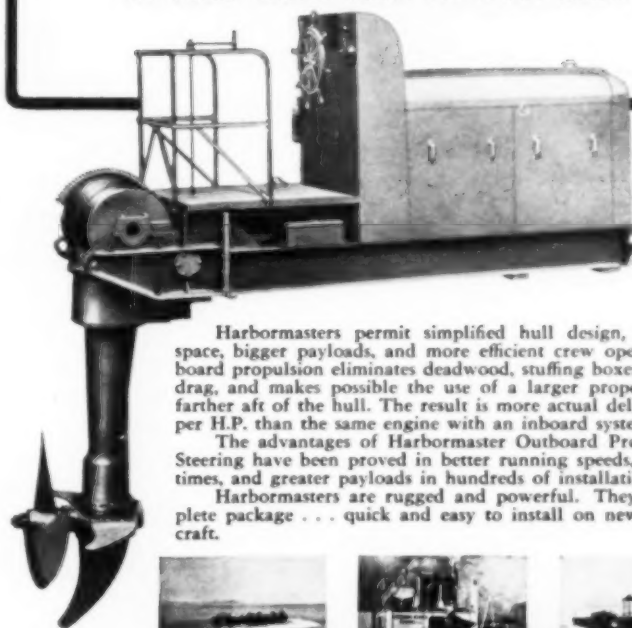
Warranty Administration for the Cummins Engine Company, Inc. Boll is responsible for the warranty administration program, the Company's product performance section and the guaranteed maintenance programs. He has been with the Cummins Engine Company since 1952 and formerly was Supervisor of Product Performance Analysis. Boll's promotion was announced by C. E. Martin, General Service Manager for the Cummins Engine Company, Inc.

Offshore Drilling Vessel

The Union Producing Company of Louisiana recently awarded a contract to Todd Shipyards Corporation of Houston for a portable, self-stabilizing, submersible elevated deck drilling unit for service in the Gulf of Mexico. The new vessel, having characteristics generally similar to many which are in operation or are being built for various owners, was designed by Friede and Goldman, Inc.,

Naval Architects and Marine Engineers, of New Orleans. It will be built to A.B. S. Classification and Inspection, and to applicable requirements of the U.S. Coast Guard. The new unit has been designed to operate in the open sea in water 76 ft deep, and in lesser depths during the hurricane season. It consists essentially of a slotted hull with an elevated drilling deck, supported by fixed columns. Lowering and raising of the hull is effected by ballasting. Stability during lowering and raising operations is maintained by four vertical stabilizing caissons, similar in principle to a large unit now being built for the Louisiana Offshore Drilling Company. The hull is of anti-scouring design, designed with sloped sides and ends. This vessel will contain a 143 ft-1,000,000 lb cantilever derrick and all necessary drilling machinery and equipment for drilling to depths in excess of 20,000 ft, diesel generator sets, helicopter landing deck, and air-conditioned quarters.

Harbormaster Outboard Propulsion and Steering Units move bigger payloads in less time and at less cost



Models from 40 to 400 h.p. Gas or Diesel

Harbormasters permit simplified hull design, more cargo space, bigger payloads, and more efficient crew operation. Outboard propulsion eliminates deadwood, stuffing boxes and rudder drag, and makes possible the use of a larger propeller, located farther aft of the hull. The result is more actual delivered thrust per H.P. than the same engine with an inboard system.

The advantages of Harbormaster Outboard Propulsion and Steering have been proved in better running speeds, shorter trip times, and greater payloads in hundreds of installations.

Harbormasters are rugged and powerful. They are a complete package . . . quick and easy to install on new or existing craft.



Complete 360 degree maneuverability. Steer effectively in any direction with full power.



Special elevating mechanism allows one-man operator to raise entire submerged assembly.



Shear pin latches tail section ride up and over any submerged obstacle, protecting it from damage.

Send for catalog which illustrates and describes in detail all the advantages of Harbormaster Outboard Propulsion and Steering.

MURRAY & TREGURTHA, INC.
QUINCY 71, MASSACHUSETTS

MURRAY & TREGURTHA, INC.
6 Hancock St., Quincy 71, Mass.
Please send me New Catalog giving details and showing many photos of Harbormasters in action.

Name.....
Company.....
Address.....

New Diesel Truck-Tractor



Three powerful new International diesel truck-tractor models with short bumper to back of cab dimensions—90 in. to rear top of cab, 91½ in. to farthest point at back of cab—have been introduced for heavy-duty highway hauling by the motor truck division of International Harvester Company. They are the four-wheel model AC-225-D, with 30,000 lbs GVW rating and GCW rating of 68,000 or 76,000 lbs depending upon rear axle and transmission specifications; and the six-wheel ACF-195-D and ACF-205-D models, both with 40,000 lbs GVW rating and GCW rating of 70,000 lbs. Each of the new units, additions to the broad International cab-forward line, offers a selection of diesel engines in the 175 to 220 hp range. Maximum driver comfort and superior engine accessibility for servicing are other common features shared by the three models.

The short BBC dimensions permit operators to make more favorable truck applications under overall length and bridge formula restrictions. Use of 35 ft square front trailers in states with 45 ft overall length limitations is made possible, as is the use of 40 ft trailers, where permitted, in states with 50 ft overall length limitations. When a trailer is in jackknife position, with the corner at its closest point to the cab (91-5/8 in. BBC), there is additional clearance at the top of the cab (90 in. BBC), allowing for tilt between tractor and trailer without "cornering" the cab where the units are close coupled or where terrain is not level.

The substantial cab is well insulated against heat and engine fumes and includes a Bostrom No. 80 Level-Ride driver's seat as standard equipment. Cab width is sufficient to assure maximum driver comfort and also to permit installation of an optional passenger seat. Maximum possible accessibility to the engine for servicing is provided by the enlarged cowl opening over the engine. This is augmented by the engine tunnel's removable cover with quick-release latches; a removable panel next to the instrument cluster permitting easier access to rocker arm covers or cylinder heads; and the direct, easy access to the fuel pump via a plate on the cab floor.

ITS NEW

Locomotive For Chile

The first completely standardized export locomotive destined for service on a foreign railroad was shipped recently from General Electric's locomotive plant here enroute to Chile. It is one of a new universal-type diesel-electric locomotive de-

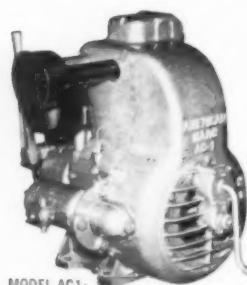
signed to operate on railroads throughout the world. The Chilean State Railways will use the 990 hp unit for narrow-gage mainline passenger and freight service. The first unit, painted with the Chilean State Railway's colors of maroon and gray, was shipped by rail to the Port of New York, then by ship through the Panama Canal to Chile. It is the first of eleven Model U9C 990 hp diesel-electrics being built for the Chilean government as part of a \$5 million order placed last year. The rest of the order included five broad-gage 1,600 hp and 15 broad-gage 720 hp locomotives. All locomotives are powered with Cooper-Bessemer diesels.



Each of the models in the group can be used for freight, passenger or switching service, and can be built for operation on any gage from 36 to 66 in. with varying coupler heights and a number of braking systems. The use of more standard parts makes possible more economical and faster manufacture and more efficient revising. Universal-type locomotives are available with hp ratings of 990, 1,320 and 1,980. Curved rubber mounts on the truck support the weight of the locomotive and result in a greatly improved ride.

LIGHTWEIGHT CHAMPIONS

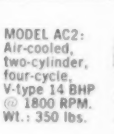
by America's largest manufacturer
of AIR-COOLED DIESELS



MODEL AC1:
Air-cooled, one-cylinder, four-cycle.
6.5 BHP @ 1800 RPM. Wt.: 220 lbs.



MODEL KBA-605:
7.5 KW permanent magnet
generator mounted
to AC2
diesel engine.
Wt.: 550 lbs.



MODEL AC2:
Air-cooled,
two-cylinder,
four-cycle,
V-type 14 BHP
@ 1800 RPM.
Wt.: 350 lbs.

AMERICAN MARC Inc. is the acknowledged leader in the field of lightweight, air-cooled diesel prime movers for all uses requiring 6.5 to 15 BHP. Prominent in the American MARC line is the new permanent magnet generator, available from 3 to 7.5 KW output. (AC or DC, and industrial three-phase). American MARC also manufactures rotating armature generators, refrigeration power units and diesel pumping units of various capacities for industrial and marine installations.

AMERICAN MARC INC.

DIESEL ENGINES

1601 West Florence Ave.
Dept. D-18

Inglewood, California
Telephone OR 8-7174

6-104

CP GAS ENGINES SET PERFORMANCE RECORDS at The Peoples Natural Gas Company

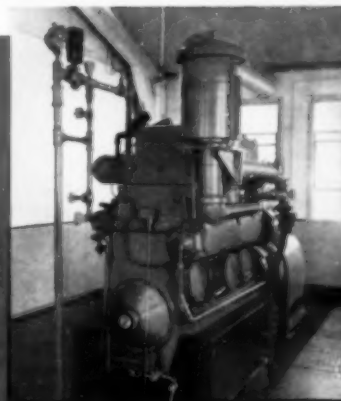
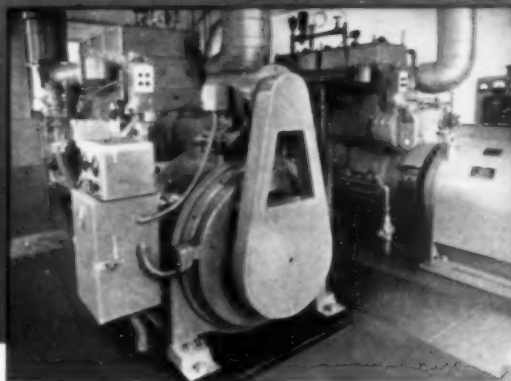
...NO REPLACEMENT PARTS IN OVER 20,000 HOURS!...

...NO PLUGS OR MAGNETO POINTS REPLACED IN OVER A YEAR!

...LUBE OIL CONSUMPTION 18,000 HP/hrs. PER GALLON!...

FUEL CONSUMPTION - LOW AS 7.3 cu. ft. per HP/hr. @ FULL LOAD

Entire plant operation depends on the CP-35, left, and the CP-42 Gas Engine in right background.



Front view of the CP-42 in operation at Peoples Natural Gas Company.

A pair of CP naturally aspirated, spark ignited natural gas engines, developing a total of 260 h.p., are installed at The Peoples Natural Gas Company, McKeesport, Pa. These units generate electricity to run water pumps cooling a bank of compressors, electricity for fan chilling the cooling water, and electricity for plant lighting and instrumentation. Operators report that these engines are easy to start, simple to maintain and respond promptly to load changes. Since their installation in September 1952, these CP Gas Engines have been rated as among the best engines of their type in the gas transmission system of this company.

CP Spark Ignited Gas Engines are available from 100 h.p. to 2000 h.p.

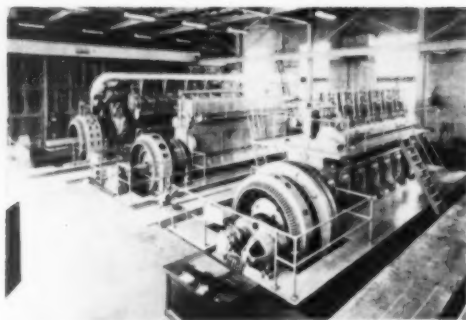


Chicago Pneumatic

8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

Engine Installation Marks Progress

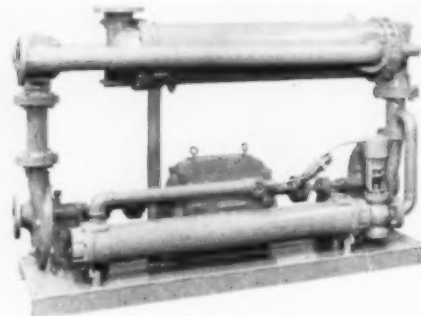


A prime example of the progress made in the development of diesel engines during the last quarter century is pictured above at the City of Independence, Iowa Municipal Light Plant. In 1931, the City installed its first air injection diesel engine in the Light Plant which had been up to that time a steam plant. Three years later, Worthington furnished the plant its first solid injection engine. Shown in the foreground, this 6 cylinder diesel is rated at 750 hp at 225 rpm. Shortly before the outbreak of World War II, another Worthington engine was installed. Pictured in the center, this unit is an 8 cylinder oil diesel rated at 1000 hp at 327 rpm. Earlier this year, a third Worthington unit was installed which is more than twice as powerful as the other two engines combined. Currently rated at 4190 hp at 450 rpm, the new unit shown in the rear is the largest dual-fuel diesel yet to be built by Worthington. This new turbocharged dual fuel engine operating

around the clock is piling up fuel cost savings at the rate of over \$100 per day.

Heater-Cooler Unit

Today's high costs are often combated by the use of prefabricated assemblies. The heater-cooler unit illustrated here is such an assembly. Piping is done in factory, greatly reducing high cost field work at time of installation. This frequently results in more efficient operation as well as lower initial cost.



The illustrated unit includes two motor driven pumps, two temperature regulating valves and two tube-and-shell heat exchangers all mounted on fabricated steel sub-base. It is representative of many made by Union Diesel of Oakland, California for installation throughout the world. However, sizes, equipment features and characteristics are custom engineered to meet specific requirements.

Marketing Director



Bertram Cole

Bertram Cole, 45, formerly with Atlas Plywood Corporation, recently assumed his new post of Corporate Director of Marketing & Distribution (Commercial Products) with American Bosch Arma Corporation, C. W. Perelle, President, announced. His position at ABA is concerned with the

overall marketing promotion and distribution of American Bosch products manufactured in Springfield, Massachusetts, and at the American Bosch Arma Mississippi Corporation plant in Columbus, Mississippi. Mr. Cole, who made his home in Brookline, Massachusetts, had been senior vice-president-marketing, with Atlas Plywood from October, 1955, until early this year. Prior to that, he was regional manager of sales and vice-president in charge of factory branches and distribution for Servel, Inc. For several years he was associated with Crosley Distributing Corporation as vice-president and general manager, and served as a member of the board of directors, Crosley Corp. His broad background in sales and product promotion began in 1934 with the Philco-New York Corporation. Later he became sales manager of Gross Distributors, Inc., NYC., assuming charge of both the sales and service departments in addition to handling war contracts for both Gross and Stromberg-Carlson Company during World War II.

DIESEL INJECTORS GMC 71 REPLACEMENT PARTS

Highest quality—Lowest prices.

PLUNGER & BUSHINGS
VALVE SPRINGS
VALVE STOPS
CHECK VALVES
INJECTOR VALVES
SPRAY TIPS

SPACERS
VALVE CAGES
VALVE KITS
TIP KITS
CONVERSION KITS
VALVE SEATS

We build special fuel pumps and nozzle parts for all diesels.

Order from your distributor—or write to us direct. We have a few available territories open for distribution.

ALLYN MFG. CO.

1758 W. Wellington Ave.
Chicago 13, Illinois
GRaceland 7-2346

Manufacturer's Agent, calling on OEM accounts, seeks automotive and industrial items to represent in California. An organization, offering technical selling at its best, tailored to serve your needs.

File #530, DIESEL PROGRESS, 816 No. La Cienega Blvd., Los Angeles 46, California

IMMEDIATE DELIVERY FROM STOCK

All Steel

New "Equity" 45' diesel tug
New "Equity" 35' diesel tug
New 110' x 30' x 6'6" Barge

Wire or phone today!

EQUITABLE EQUIPMENT CO., INC.

410 Camp St. New Orleans 12, La.

WANTED

Surplus parts for Fairbanks-Morse Model 35 F10 M: Cylinders, Pistons, Cyl. Heads, Fuel Injectors and Fresh Water Heat Exchangers. Reply to: MILNE, 141 Chippewa Ave., Tampa 6, Fla.

GENERATOR SETS

520 KW

Superior: Diesel or Dual Fuel, 8 cyl. 14½" x 18" Model VDSB engine, 327 RPM, E.M. generator, 2,400 V, 3 ph. 60 cy. Complete with heat exchanger cooling, switchboard, and accessories.

480 KW

Superior: Gas, 8 cyl. 14½" x 18" Model VDSC, 327 RPM, G.E. generator, 2,400 V, 3 ph., 60 cy. Complete with heat exchanger cooling, switchboard, and accessories.

1200 KW

Chicago Pneumatic: Dual Fuel, 8 cyl. 16" x 22" Model 862-CPS-DF, 327 RPM, E.M. generator, 2,400 V, 3 ph., 60 cy. Complete with radiator cooling, switchboard, and accessories.

350 KW

Superior: Gas, 8 cyl. 12½" x 15" Model LOC, 400 RPM, G.E. generator, 480 V, 3 ph., 60 cy. Complete with heat exchanger cooling, switchboard, and accessories.

MACHINERY IN EXCELLENT REBUILT CONDITION AT BARGAIN PRICES

We are liquidating our engine power plant

PEOPLES UTILITIES, INC.

P. O. Box 941

New Orleans, La.

The Greatest Improvement

in Diesel-electric locomotive engines, since railroads adopted it, is

Channelcromium

SECURING AN ALL TIME LOW in the rate of lubricating oil consumption, and less fuel, sustaining engine power with piston rings operating gas tight. Write for new bulletins.

PENNINGTON CHANNELCROMIUM COMPANY

319 Dakota St., San Antonio 3, Texas



Another San Diego Tuna Clipper



Shown above slipping out of San Diego Harbor, headed toward the Galapagos Islands, is the latest addition to San Diego's expanding fishing fleet. Recently launched at National Steel and Shipbuilding Corporation, the motor vessel *San Juan* is the ninth vessel added to the fleet since 1955.

Skipped by Dave Ricco, former master of the *M. F. San Jason*, the *San Juan* will fish for Westgate California Corporation, under the trade name, Breast O' Chicken Tuna. The vessel will be operated out of the Port of San Diego by National Marine Terminals, Incorporated.

Brief Specifications

Length, overall	127'-0"
Beam, moulded	30'-6"
Depth, moulded	14'-6"
Total Fish Capacity	340 tons
Total Fuel Capacity	48,551 gal.

Fresh Water Storage 4,000 gal.
Lubricating Oil Capacity 1,600 gal.
Crew's Quarters (including captain's) 15 men
MAIN ENGINE: Fairbanks-Morse 960 hp Model 38D8-1½, 6 cylinder 720 rpm, opposed piston, direct reversing, marine propulsion diesel engine. Furnished with reduction gear with a 3:1 ratio, rated at 960 hp at 720 rpm.

Filter Sales Manager



Graham C. Thompson

Announcement was made recently by Mr. Charles I. Wallace, Vice-President and General Manager of Indiana Commercial Filters Corporation, Lebanon, Indiana, that Mr. Graham C. Thompson has been appointed Sales Manager of the Michiana Division of the Company. Mr. Robert N. Burckhalter, Sales Manager of this Division since 1927, has retired. He will continue to serve the Company in a consultant capacity. Mr. Thompson, a graduate of North Carolina State University, has been with the Company since 1949 except for a two years' leave of absence on duty in the U. S. Navy. His previous assignments with the Company have been in the Engineering Department, Project Engineer, and as Administrative Assistant. Effective December 1, 1957, the Michiana Division

Sales Office located in the Company's Chicago Office was moved to Lebanon, Indiana.

South Florida's Largest Dragline

The Hooper Construction Co. in Dade County, Florida, is employing this model 200W Bucyrus-Erie in their rock pit to dig over 200 yds of rock an hour. Powered with a G.S.6 Cooper-Bessemer diesel having a bore and stroke of 10½ x 13½, it delivers 340 hp at 550 rpm. It is the largest dragline in South Florida and is used to stockpile rock for two other dieselized draglines which in turn load the G. M. dieselized Euclid 21 yd bottom dumps.



Other specifications are a 125 ft boom with a 6 yd bucket, 10 V belts driven from a power take-off drive a 45 kw dc Westinghouse generator. It is radiator cooled with Fulton Sylphon regulators.

This operation has proven so successful that two more draglines of similar design are expected soon for other rock pits in South Florida.

DIESEL ENGINE CATALOG

The purpose of this little advertisement is to tell you about Volume 22 of DIESEL ENGINE CATALOG which is now available, entirely revised and rewritten. This is the 22nd edition of the book that has earned the name of "the bible of the industry."

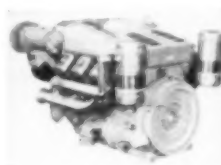
All smart diesel engine salesmen carry this book around in their car. When they run into some new competition with which they are not too familiar, the DIESEL ENGINE CATALOG gives them full, accurate information when they need it most.

The consulting engineer keeps this book in his reference file. It immediately gives him all data on diesel engines coming within a given horsepower range, speed range and weight range.

People who sell, people who buy, people who use diesel engines need this new, fully illustrated, up-to-the-minute volume. It has been completely revised and expanded. Orders are now being accepted for this latest edition. Price \$10.00 prepaid.

Add California Sales Tax for Delivery in That State

DIESEL PROGRESS
816 NO. LA CIENEGA
LOS ANGELES 46, CALIFORNIA



**Modern, Heavy Duty
Diesel Engines
for all types of
Contractors' Equipment,
Industrial & Marine
Applications**

**Air Cooled Diesels 3 to 120 HP
Water Cooled Diesels 6 to 200 HP
Generating Sets AC & DC 1½ to 120 KW
INSTANT START . . . RELIABLE . . . ECONOMIC**

World-wide service supporting more than
1,000,000 engine sales
Immediate delivery on smaller engines
and generating sets

PETTER DIESEL ENGINES

Div. of BRUSH ABOE, Inc.
60-07 39th Ave., Woodside, N.Y.
DEfender 5-7100

CRANK-SHAFT REPAIRS

• REGRINDING • METALLIZING • STRAIGHTENING • THERMIT WELDING • CRANKPINS TURNED OFF IN PLACE

SPECIALIZING IN LARGE CRANKSHAFTS

BRODIE SYSTEM 115 CLIFTON PLACE
BROOKLYN 38, NEW YORK
AN ENGINEERING SERVICE MAIN 2-5242

MODERN SLOW SPEED

**DIESEL ELECTRIC
GENERATOR SETS**

• **600 RPM—Worthington BBS**
100kw 3/60/480

• **300 RPM—Fairbanks Morse 33F16**
1125kw 3/60/480

Complete With All Auxiliaries

Other Sets From 20kw to 1200kw

DIESEL DIVISION

National Metal & Steel Corp.
TERMINAL ISLAND (Los Angeles Harbor), CALIF.
PHONE: NEVADA 6-9871

ARE YOU HAVING WATER TROUBLE IN YOUR DIESEL FUEL?

MAYBE WE CAN HELP YOU.

PHONE, WIRE OR WRITE US.

INDUSTRIAL • FILTRATION SERVICE • AUTOMOTIVE

Ernest W. Dumler Co., Inc.

DEVELOPMENT — ENGINEERING — RESEARCH

6324 PENN AVE.

PITTSBURGH 6, PENNSYLVANIA

PHONE HIland 1-4578

SAVE HALF



**HANCOCK Reclaims
Plungers and Bushings for
Any Diesel Injection Sys-
tem.**

—Write for Catalog
and Prices Today—

HANCOCK
DIESEL SERVICE CO.

300 Walnut St.

Findlay, Ohio

ADVERTISERS' INDEX

Alco Products, Inc.	24	Hancock Diesel Service Co.	80
Allis-Chalmers Mfg. Co.		Harrison Radiator Div.,	
Buda Division	16	General Motors Corp.	2
Allyn Mfg. Co.	78	Hartford Machine Screw Company	72
American Bosch Division of		Hercules Motors Corporation	5
American Bosch Arma Corp.	70	Houdaille Industries, Inc.	
American MARC, Inc.	76	Buffalo Hydraulics Division	65
Amot Controls Corp.	68	Koppers Company, Inc.	19
Brad Foote Gear Works, Inc.	61	Lake Shore Electric Corp.	71
Brodie System, Inc.	80	Lane Plating Works	80
Brush Aboc, Inc., Petter Engine Div.	79	Marquette Metal Products Div.,	
Buda Division,		Curtiss-Wright Corp.	73
Allis-Chalmers Mfg. Co.	16	Miehle-Dexter Supercharger Div. of	
C. A. V. Ltd.	55	The Christensen Machine Co.	69
Chicago Pneumatic Tool Co.	77	Morco, Inc.	63
Cities Service Oil Co.	59	Murray & Tregurtha, Inc.	75
Clark Equipment Company	Third Cover	National Metal & Steel Corp.	80
Cleveland Diesel Engine Div.,		Nordberg Mfg. Co.	14
General Motors Corp.	22	Pennington Channelchromium Co.	78
Commercial Filters Corp.	23	Peoples Utilities, Inc.	78
Cook Company, C. Lee	20	Quincy Compressor Co.	64
Cooper-Bessemer Corp.	Fourth Cover	Schwitzer Corporation	6
Curtiss-Wright Corp.		Standard Oil Co. of California	9
Marquette Metal Products Div.	73	Texas Co., The	Second Cover-1
Utica-Bend Division	8	Thomas Flexible Coupling Co.	57
DeLaval Steam Turbine Co.	15	Thompson Products, Inc.,	
Delco-Remy Div.,		Jet Division	17
General Motors Corp.	66-67	Twin Disc Clutch Co.	7
Dumler Co., Inc., Ernest W.	80	Utica-Bend Division,	
Electric Machinery Mfg. Co.	4	Curtiss-Wright Corp.	8
Elliott Company	18	Waukesha Motor Company	21
Engineering Controls, Inc.	53	W. G. B. Oil Clarifier, Inc.	76
Erie Forge & Steel Corp.	12	Winslow Engineering & Mfg. Co.	62
Fairbanks, Morse & Co.	60		
Fuller Manufacturing Co.	13		
Garrett Corporation, The			
(AiResearch Industrial Div.)	11		
General Motors Corp.			
Cleveland Diesel Engine Div.	22		
Delco-Remy Div.	66-67		
Harrison Radiator Div.	2		

Grinding and Hard-Chrome Plating of Diesel Engine Crankshafts



ALL SIZES

Complete facilities for grinding, plating, Magnafixing, and electrically-controlled heat-treating.
Largest hard-chrome plating plant in the Mid-Continent area. Experience • Quality • Precision

**LANE
PLATING WORKS**
5322 BONNIE VIEW RD.
DALLAS, TEXAS

CLUTCH CONTROL ACTUATION

TORQUE
CONVERTER

HYDRAULIC
DISCONNECT
CLUTCH

SYNCHRONIZERS

CONSTANT MESH
HELICAL GEARS

Watch those operating costs **SHRINK** with **CLARK TRANSVERTER** on the job



Trucks Operating
on delivery schedules



Coaches making frequent stops



Refuse collection



Concrete mixers and
similar industrial applications



Materials handling machinery



Many stationary power plants
and oil field applications

A revolutionary "package" power train of seasoned veteran units

• Torque Converter • Hydraulic disconnect clutch • Transmission
for vehicles in "frequent start" service

No heavy friction clutch—

Eliminates the driver's "tired left foot."
Hydraulic clutch is controlled by push-
button or light-pressure pedal. Inching
is easy, just by using accelerator.

Much less gear shifting—

Most work can be done *without shifts*.
Closely spaced ratios make shifts fast,
smooth, quiet.

Smooth starting, smooth acceleration—

No stalling, no lugging, no wheel slip-
ping. Torque converter supplies a

smooth power-flow—no shock-loading.
Much longer life for drive-train.

Ideal accessibility for service—

Every unit is easy to get at. No special
tools needed. No clutch adjustment re-
quired—big savings on costly down-time.

Available for OEM or field conversion—

Add up these vital benefits and you get
just one answer: **LOWER COSTS**. It's
easy to get the whole worthwhile story—
send the coupon for the TRANSVERTER
Bulletin.

CLARK®
EQUIPMENT

CLARK EQUIPMENT COMPANY, Transmission Division, Falahee Road, Jackson 18, Michigan
Please send the TransVerter Bulletin

NAME _____ COMPANY _____
POSITION _____ ADDRESS _____
CITY _____ ZONE _____ STATE _____

EFFICIENCY plus
STAMINA
with power by
Cooper-Bessemer

INSIDE?



For Argentina's expanding program of inland waterway transportation . . . two new Dravo-built towboats each powered by twin Cooper-Bessemer LS Diesel engines rated 2400 hp at 260 rpm.

These big pusher-type river towboats will move tow loads of nine or more 1,000-ton barges along Argentine waterways. Cooper-Bessemer diesels in the engine room assure plenty of power and stamina.

Outstanding records of plus performance in scores of similar workboats are good reason to learn more about the new things now being done by one of America's oldest engine builders. Cooper-Bessemer heavy-duty marine diesels are available from 300 to 5000 horsepower.

BRANCH OFFICES: New York City • Seattle, Wash. • Chicago, Ill. • Houston, Texas • Washington, D. C. • San Francisco and Los Angeles, Calif. • St. Louis, Mo. • Gloucester, Mass. • New Orleans, La.

SUBSIDIARIES: Cooper-Bessemer of Canada, Limited • Halifax • Nova Scotia • Cooper-Bessemer International Corporation • New York • Caracas

Ready for launching...one of two Cooper-Bessemer powered towboats built by Dravo Corporation for the Argentine government.

Cooper Bessemer

GENERAL OFFICES: MOUNT VERNON, OHIO

ENGINES: GAS • DIESEL • GAS-DIESEL
COMPRESSORS: RECIPROCATING AND CENTRIFUGAL
ENGINE OR MOTOR DRIVEN